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We print this week an argument by W. C. Brown for a general increase in freight rates. Mr. Brown believes that one of two things must be done—wages must be reduced or rates must be increased—and he says frankly that he is afraid of the strikes that would follow a reduction in wages. He argues also that an increase in freight rates would not affect commodity costs materially, but that the railroads would utilize the funds thus obtained in expenditures which would hasten the return of prosperity. The relation between increased freight rates and prosperity does not appear to us quite as direct and immediate as it is set forth by Mr. Brown, but his paper, nevertheless, puts on record several very important points. It demonstrates, just as C. S. Sims demonstrated (*Railroad Age Gazette*, June 5), that the freight charge is a wholly inconsiderable part of the cost of most goods that the retail consumer buys; also that the trend of rates has been downward, with great reductions in the last forty years, while wages have gone up almost steadily during the same period. The gist of the argument, as we see it, is that railroads are not now making as good a living, per unit of capital invested,

as the other national industries are. A fractional difference in freight rates is of no real consequence to the manufacturer or to the consumer, yet the efforts to equalize, at least in part, the greatly increased costs of labor and of materials, have been opposed bitterly. What Americans ought to ask of the railroads is steady and painstaking betterment of physical structure, equipment and personnel, so that service will be made better and accidents fewer. Cheapened service not only is of no consequence in itself, but it makes the really important things extremely difficult to bring about. As common carriers, railroads have public duties; they should therefore be permitted to be efficient common carriers.

The railroads are in politics. They ought not to be there, but there is no use blinking the fact that they are there. They figure prominently in the national platforms of both great parties. They will be discussed during the campaign from every rostrum and in every community. Upon the way they are treated will depend how many men they can employ and what they can pay them. What the party platforms say, past experience has shown, is of less significance than the views of the individual candidates. If railroad employees know where their true welfare lies they will study this question thoroughly and discuss it, in every part of the country, with their neighbors and with the candidates for public offices. They will also study carefully the records and speeches of every candidate; and they will make it clearly understood that their votes will not be cast this fall for any man who does not intelligently recognize and candidly concede that railroads and railroad employees, as well as travelers and shippers, have interests and rights to be respected by lawmakers and public officials, state and national.

The decision of the Interstate Commerce Commission on New York city demurrage rates, reported in this issue, is notable for two reasons: first, it sustains high demurrage rates where land is exceptionally valuable; second, it orders demurrage rates reduced without giving any reason to sustain the reduction. The railroads have been charging \$6 per car per day, after the sixth day. The commission approves the principle of increasing the rate as time progresses, but says that the \$6 rate should be reduced to \$3. Whether or not the railroads will appeal we do not know. Probably they had better not. Demurrage matters have to be conducted somewhat loosely at best; and it will not be well to contend for too high a degree of precision. From Commissioner Prouty's statement of the case it would appear that neither party said anything about the difficulty of making proper allowances for stormy weather or for excessive delays in transit; from which it is fair to conclude that all parties are content without digging too deeply into the equities of the matter. The case was heard and decided on the hot days of June, when everybody wanted to get off on his vacation, and Commissioner Prouty evidently thought it fair to let the fine points go until cooler weather—when, very likely, the question will be brought up by somebody else. Till then we have, in this decision, an example of a tariff (on demurrage) based on the fact that the commissioners "feel" that the railroads' figure was too high, while at the same time it is a tariff which is as rigid as any ever issued by the Medo-Persian Great Central Air Line. Commissioner Harlan thunders out the dictum that a tariff, once established, according to law, is as sacred as though it had been unanimously adopted by Congress after a three days' debate, and here Commissioner Prouty establishes a tariff, according to law, because the commissioners "feel" that it is right. This "feeling" is declared twice, the repetition indicating, perhaps, what an irksome job it would be to make a logical statement of the reasons for condemning the \$6 rate. But, as we have intimated above, the main thing is that the commission has given hearty support to the demurrage principle. "We recognize," says the

report, "the great importance of the prompt discharge of equipment and shall co-operate with the carriers in securing this by permitting the establishment and enforcement of whatever demurrage regulations may be necessary. In *Wilson v. Pennsylvania Railroad Company*, 14 I. C. C., 170, we approved charges higher than those here established. In that case, however, the track charges applied only to the detention of cars loaded with fruits and vegetables . . . and were imposed to prevent gross abuse." This declaration of the commission will silence much grumbling on the part of consignees. Consignees are not to be severely condemned for claiming in the past that demurrage was unjust, for railroad officers have not sustained the principle with the vigor that they should have exercised; passively, at least, they have often encouraged consignees to resist. The commission men of New York city say that they make only \$1 a ton on the hay that they sell; and until the rates were raised they never charged demurrage to the buyer, because—although they charged him the freight—a demurrage charge gave evidence that the middleman had been dilatory. This being so, Mr. Prouty thinks that the hay agents would not allow demurrage to accrue unnecessarily. And so he is easy with them. But it is by no means certain that this is a correct assumption. In the first place, the agent will probably shove the demurrage burden back on the shipper (the report indicates that the New York men actually have done this). And, whether he does or does not succeed in evading the burden, he is under a constant incentive to order hay faster than he can sell it, because that is an essential element in the sharp competition at such a large market. The selling agent is going to gage his orders exactly in proportion to the prospects of finding purchasers, if he can; but to succeed in his business he must always give the purchaser the benefit of every doubt. To order too many cars may cost him money; but to order too few may cost him his business. Only by a very firm policy will it be possible to sustain the fundamental principle that a car cannot legitimately be used as a storehouse.

DOES CITY TRANSIT PAY ?

Does it pay to furnish rapid transit to great cities? It used to be thought that it paid exceedingly well. The old horse-car lines that ran short distances and gave few or no transfers were often extremely profitable. Then they were electrified at great cost, or, as in the case of New York, they were changed to cable lines, and the cable investment was thrown away and they were electrified with the most expensive system in the world—the underground conduit. Then great systems were formed, absorbing companies right and left, and the transfer privilege was extended until it became possible to ride considerably more than the entire length of Manhattan island for five cents and do a great deal of crosstown work in the bargain. It is unfortunate that the New York experiment could not have been conducted without the shameful loading of originally sound properties with entirely unjustifiable debts and rentals, and it is probable that the same kind of management that bankrupted the Metropolitan Street Railway would have bankrupted any other kind of railroad. But the situation as it now stands shows that, regardless of the scandalous debt load, some of the lines cannot be made profitable operating propositions on the present free transfer system, and the receivers, with the support of the courts, have been cutting off transfers right and left. The same thing is exemplified in Brooklyn. With strikingly good management, the Brooklyn Rapid Transit is paying its expenses and charges, and earning a small rate on the investment besides, though this rate is not at all commensurate either with the risk of the investors or with the skill displayed in the management. Yet a good part of the lines comprised in the Brooklyn Rapid Transit are run at an operating loss. Some 13 per cent. of the company's entire car mileage is on Brooklyn Bridge, and no return at all is received for the use of this mileage, except from an insignifi-

cantly small number of passengers who pay fares for crossing the bridge without continuing their journey. From 1900-1907, inclusive, this bridge traffic cost the company \$4,410,872 more than it brought in.* Yet the city requires a large payment from the Brooklyn Rapid Transit for the privilege to run these cars at a loss. The present expenditure of around \$175,000 for elevating two of the tracks at the Brooklyn end of the approach upon the bridge structure, may be called a gift from the Brooklyn Rapid Transit to the city, since it can take no title to this improvement work, although, of course, it helps in reducing congestion, and by so much helps the company increase its earnings. The Massachusetts Railroad Commission in its last report called attention to the fact that certain street railway lines near Boston were unable to pay on a five-cent fare, and expressed its willingness that this rate of fare should be increased to six cents. It seems very clear that some such increase in fare, either directly or through the cutting off of transfers, must come to the aid of our great city rapid transit lines in the near future. They are now rounding out some fifteen years of what is really the only rapid transit in city streets that the world has ever known, except for certain elevated lines formerly run by steam, to the great annoyance of nearby residents. The electric lines have developed and expanded—and have given too much for the fare they have charged. It is obvious that they must therefore either curtail their expansion or increase their fare. The process will be a painful one, accompanied by much political bravado and blackmail, and the danger is that that summation of inefficiency, municipal ownership, will find its chance to drain the taxpayers while the process is going on. Meantime, the small and compact railway systems are likely to fare better than the big and rambling ones, instead of prospering altogether in the direct ratio of traffic density, for the defect of our city rapid transit operation has been that the simplicity and political convenience of the nickel fare has caused distances to be forgotten, so that the street car line in the great city generally performs twice as much work for the money as the street car line in the small town. Amid all the grumbings at transit monopoly, one point has persistently been overlooked, and that is that the traveler, who does the grumbling, has each year got more and more for his nickel, while the stockholder, who is grumbled at, has seen a steady depreciation in the value of his security.

THE NORTHWESTERN LUMBER RATE CASES.

The decisions of the Interstate Commerce Commission in the Northwestern lumber rate cases (*Pacific Coast Lumber Manufacturers, et al v. Northern Pacific, et al*; *Oregon & Washington Lumber Manufacturers' Association, et al v. Union Pacific, et al*, and allied cases), pamphlet reports of which are now at hand, suggest that the Commission is prone to forget that it is not the traffic manager of the railroads, but a quasi-judicial body empowered to determine the reasonableness of rates after the traffic managers have made them. The facts and conditions that influenced the Commission's conclusions in these cases were all pertinent to be considered, and doubtless were considered, by the traffic managers in deciding whether it was

*Bridge mileage, 1900-1907:

Surface	20,166,000
Through elevated	6,718,000
Local railroad	10,857,000
Total	37,741,000
Take expenses, per car-mile at:	
Track, 1.3c.; cars, 2.5c.; power, 2.4c.; crews, 4.6c.;	
legal and damages, 1.4c.	
Total	12.2c.
Cost of 37,741,000 car-miles at 12.2c.	\$4,604,402
Add surface tolls	447,515
Rental local railroad	162,450
Elevated tolls	730,250
Taxes on earnings	15,492
Total cost	\$5,960,109
Credit, local earnings	1,549,237
Net loss.	\$4,410,872

(Note that this is an operating loss. Capital charges not included.)

expedient to advance lumber rates. But many of these facts and conditions had no direct bearing upon the only questions which, under the law, the Commission had any right to consider, viz.—whether the rates on lumber that the transcontinental lines put into effect on November 1, 1907, were reasonable, and if they were unreasonable, what rates would be reasonable. The raises in rates in question are the most important that have been made by American railroads to offset the enormous advances in operating expenses caused by increased wages and prices of materials; and it is perhaps within the bounds of conservatism to say that the principles involved in the consequent litigation are of vital importance.

The Commission held that all the increases made—which were from 15 to 25 per cent. over the rates that had been in effect since 1893—were unreasonable, but permitted advances of about 8 per cent. to points east of a line from Grand Forks, N. Dak., through Missouri river points to Galveston, Texas. The principal grounds upon which the decisions were based were: (1) That the rates superseded had been in effect for a long period of years, and must therefore be regarded as reasonable. (2) That an advance would injure the large lumber manufacturing industry in the Northwest, which the old rates had helped to build up. (3) That the railroads had been earning large profits on the rates previously in effect. We shall briefly examine these propositions in the order in which we have stated them.

(1) The Supreme Court said in *I. C. C. v. Chicago Great Western* (209 U. S., 119): "Undoubtedly, when rates are changed the carrier making the change must, when properly called upon, be able to give a good reason therefor, but the mere fact that a rate has been raised carries with it no presumption that it was not rightfully done." Once the carrier has given an explanation of an advance that is "prima sufficient," the law imposes upon the shipper the burden of proving that the new rate is unreasonable. The carriers made such an explanation in these cases. They showed among other things that the low rates in effect for 15 years were applied when empty car movement was eastbound, and that it is now westbound, and that meantime the prices of lumber, the profits of lumber manufacturers and the operating expenses of railroads have increased greatly; in other words, that conditions have grown up which make it possible for lumber to bear higher rates than formerly, and desirable and necessary from the railroad standpoint that it should do so. The opinions indicate that, nevertheless, the Commission proceeded throughout upon the assumption that the advance was *prima facie* unreasonable, and that the carriers were bound to demonstrate that it was reasonable. Chairman Knapp and Commissioner Harlan, in their dissenting opinions, plainly indicate that they regard the attitude of the majority as not, in this respect, in harmony with the law.

(2) It is probably true that the advance in rates, if sustained, would reduce the profits of the lumber shippers of the Northwest—profits whose magnitude they have owed mainly to the low freight rates they have enjoyed. But no class of business concerns has a vested right to make large profits—certainly not at the expense of another class of business concerns. The railroads concerned in this litigation have been much more notable for creating and fostering traffic with low rates than for destroying it with high rates.

(3) The Commission found that the operations of the roads had been profitable for several years on the old rates. It would have been more pertinent, since it was passing upon the reasonableness, not of the old, but of the new rates, for it to have determined whether railroad profits under the higher rates would be excessive in view of the large increases in operating expenses. The annual reports of the four principal roads involved show that the Union Pacific's gross earnings in the fiscal year 1907 increased 13.02 over 1906, while its operating expenses—allowing for sums charged in 1906 to future maintenance and renewals—increased 22.75 per cent.;

that the Great Northern's operating expenses increased 26 per cent. and its net earnings declined 11.18 per cent.; that the Northern Pacific's operating ratio was 55 per cent., as compared with 50.8 per cent. in the fiscal year before; and that the Southern Pacific's gross earnings increased 18 per cent., while its operating expenses—allowing for sums charged in 1906 to future maintenance and renewals—increased 21.54 per cent. Furthermore, as Chairman Knapp says in his dissenting opinion, it seems entirely clear that the lumber traffic, the ton-mile rates on which were very much less than the ton-mile rates on all the traffic of these railroads, had not been bearing its fair share of the burden of the cost of transportation. When the old lumber rates were made in 1893, the movement of empty cars eastward was very large, and as the cars had to move any way, the direct cost of hauling lumber in them was very small and the roads could profitably handle it at very low rates. Now that the empty car movement is westward, the transportation cost directly and necessarily incurred in handling lumber has greatly increased. Finally, lumber prices average at least 50 per cent. higher now than they did during most of the period when the low rates were in force, and therefore lumber can bear, and on the value of the service principle ought to bear, proportionately higher rates. If the result of an advance should be to make the average rates and earnings of the roads excessive, the thing to do would be to reduce the rates that were too high, not to compel the carriers to continue to apply rates that are too low.

Should the transcontinental railroads appeal from the decisions of the Commission to the courts, the opinions of the Supreme Court of the United States in the Yellow Pine lumber cases (*Southern R. Co. v. Tift*, 206 U. S., 436, and *Illinois C. R. Co. v. Interstate Commerce Commission*, 206 U. S., 466) will be strongly relied upon as precedents supporting the position of the Commission. But there are some very important differences between the Yellow Pine and the Northwestern cases. It was shown in the opinions in the Yellow Pine cases that there had been no considerable recent advances in prices of lumber, while in the Northwestern lumber cases it was shown that there had been very great advances of prices. No marked increases of the operating ratios of the railroads preceded the raises of the rates on yellow pine, while very heavy increases in the ratio of operating expenses immediately preceded the advances in rates from the Northwest. The question of allowances to logging logs, which was involved in the Yellow Pine cases, does not come in to complicate the Northwestern cases. The old rates on yellow pine were not made originally, as were the old rates from the Northwest, to get traffic for a movement of empty cars, the direction of which has been reversed. In view of facts, such as these, it would be very unsafe to infer, because the courts sustained the decisions of the Commission in the Yellow Pine cases, that they would also sustain its decisions in the Northwestern lumber cases.

PUBLIC RELATIONS OF WURTEMBERG EMPLOYEES.*

All officers and employees of the Wurtemberg State Railroad administration by their behavior in intercourse with each other and with the public, are to aid in preserving the reputation of the administration. Duties are to be performed quietly and without unnecessary noise. Questions are to be put and answered briefly, clearly, and to the point. Unnecessary discussions should be avoided. In service no conversation should be held except what is required for the service. Matters relating to the service are not to be talked about in the presence of strangers who are not concerned with them. It is out of place to discuss occurrences in the service in taverns or other public places. For superiors and subordinates, men in the same service and men of different branches of the service to be on good terms makes everyone's task

*General Rules of the Wurtemberg State Railroads governing the intercourse of its employees with each other and with the public.

easier. It is therefore for the advantage not only of the management but also of the individual employees if the latter mutually support each other in their work. Employees of the same rank must be friendly and obliging to each other. The relation between superiors and subordinates should be confiding, but not familiar. Every official should regard his subordinates and those of lower rank in the service as his appointed fellow-laborers, treat them kindly and avoid offensive or unfriendly behavior. The subordinate by his behavior should show that he deserves the confidence placed in him. By frank and open conduct he should show himself obliging and modest, without servility. Should there be occasion to warn or blame a subordinate, this is to be done in a quiet manner, to the point, without roughness, and not in a harsh tone, and whenever possible not in the presence of unconcerned persons or of subordinates of the man rebuked. It is seemly for young officials to be respectful to their elders, even to those who are subordinate in the service. Decorum requires that the subordinate salute the superior. An employee in uniform, if no more than the uniform cap, will give the military salute. Superiors will not neglect to return the salute.

Toward employees of other railroads, and toward postoffice, custom house, sleeping-car and dining-car employees, an obliging disposition is to be observed. With the public the employee must be courteous, friendly and helpful. Reasonable requests are to be attended to so far as possible and without disobliging others. Care must be had to remove warranted causes of complaints. All officials when greeted by travelers should return their greetings. This is expected especially of the men at the ticket windows.

Questions by travelers or others are to be cheerfully answered. For example, should a passenger ask about a certain train, he should not be referred to a time-table or other placard, if the employee questioned is able to answer. The information required should be given clearly and intelligently, and remarks not concerning it be avoided. If the employee questioned is not able to give the information himself, he should at least tell where and how it can be had. Also the employee should be obliging in regard to other requests from the public.

Private conversations with the public should not be had during service. In case of differences of opinion with the public, decided but quiet and courteous demeanor is to be observed, even when it is evident that the persons in question are in the wrong. Above all, offensive remarks are to be avoided when examining tickets and the like. Violations of the regulations are to be opposed decidedly. Especially is prohibition of smoking in the cars and compartments designated for non-smokers to be sternly enforced. Passengers are to be protected as far as possible from improper behavior on the part of fellow-passengers; but in doing this, even, all harsh, uncourteous or offensive behavior is to be avoided. Employees not on duty when riding on trains are expected to call the attention of those on duty to any improprieties which they may observe.

In entering and leaving the cars and during the journey the public is to be assisted. The proper employees must exert themselves to place the passengers properly and quickly. Those entering or leaving the cars should not without necessity be urged unduly to haste. Assistance must be offered to women and children traveling alone, in getting on and off cars, as also to other feeble passengers, when necessary.

On entering cars of all classes, employees in uniform, not only those belonging to the train, but any others riding on it, are to salute by raising the right hand to the uniform cap. In all classes of cars, the request to show tickets is to be preceded by the word "Please," spoken loudly and distinctly. Railroad officials, including those of other railroads, as shown by their passes, are to be saluted by the train conductors and platform men.

The general management trusts that every railroad official and laborer will be careful to follow the foregoing rules, and it assures emphatically its protection to everyone who has good grounds for complaint of improper treatment by any superior, associate or subordinate, or by persons outside of the service.

NEW PUBLICATIONS.

Brief on Railway Rate-Making Legislation.

Referring to the review of this pamphlet in the *Railroad Age Gazette*, July 10, Carman F. Randolph states that the pamphlet has not been published, and is not for sale, having been prepared for private circulation.

Massentransport. Ein Hand- und Lehrbuch über Forder- und Lagermittel für Sammelgut. Von Professor M. Buhle, Dresden. Mit 895 Abbildungen und 80 Zahlentafeln. Deutsche Verlags-Anstalt, Stuttgart. 22 mark.

The commerce of the world has attained such enormous proportions and the needs of engineering enterprises have become so pressing, that for moving, storing and disposing of large volumes of material, hand labor has been supplanted largely by mechanical appliances. The result has been a cheapening of the costs of handling and of transportation, an improvement of the conditions surrounding labor and an increase in its efficiency. The author has for a long time given especial attention to the study of the handling, transporting and storing material, and he has since 1898 furnished many valuable contributions on this subject to German technical literature. Commercial transportation by railroads or by vessels is excluded from the field covered by this publication. It treats particularly of the methods and appliances for handling material to and from trains, vessels, etc., to storage places, to excavating and dredging and to the construction of storage plants and their operation.

The subject is treated under four heads. I. General economic considerations; 12 pp. II. The relations between the volume and the weight of a great variety of substances and materials; 4 pp. III. An exhaustive discussion of the appliances for transport and of the arrangement of storage plants. This is a systematic description of apparatus of all kinds used. Under appliances for handling and moving are given the various types of haulage and of motive power for the same, dredges, excavators, conveyors (bucket, screw, pneumatic, hydraulic, etc.), cranes, travelers, in short, the great variety of mechanical appliances that have been evolved for handling material. Under storage plants are given the different systems of plants and a description of their construction. The treatment is remarkably concise and clear, a result that has been attained in part by a very liberal use of illustrations and diagrams, good use having been made of the fact that a well chosen diagram is often worth several pages of text; 254 pp. IV. furnishes examples of the handling of material in different plants and under various conditions—gas works, industrial establishments, power plants, vessel loading, garbage treatment, etc.; 20 pp.

The ground covered is extensive and in conformity with the plan of the work the treatment is concise. There are copious references to technical literature and to articles in technical periodicals, thus furnishing means of obtaining much more detailed information than can be given in a hand and reference book. The number and excellence of the illustrations is a feature. Our country has no mean record of achievement in handling and moving material cheaply, our storage plants are among the largest. While a great many have the beauty of adaptation to the purpose for which they were created, few can lay claim to the beauty that pleases the eye. In this regard a great improvement is possible and it is evident from pictures in this work that it is possible, for instance, to so construct a grain elevator that it shall have an architectural value and at the same be most excellent from an engineering point of view.

This compendium of Prof. Buhle's covering the entire field

of handling, moving and disposing of material is of great value to all who are in any way interested in the subjects of which it treats.

Letters to the Editor.

PROPOSED IMPROVEMENT IN TRAIN-ORDER FORMS.

Nashville, Tenn., July 1, 1908.

TO THE EDITOR OF THE RAILROAD AGE GAZETTE:

I hand you herewith a 19 and a 31 train order form slightly modified to make them more practicable. The objection to the standard forms is that there is not enough room for the address. Although a 19 order becomes a holding order, the same as the 31, after being repeated, and until completed, there is no place on the 19 form to show when repeated. There can be no objection to printing "C & E," as I propose, for if an order is addressed also to the operator, as is necessary in using middle orders, such address can be written on the second line. There is an advantage in having "C & E" printed, for when it is not printed operators often fail to write it. Although 31 orders are often addressed to operators, the standard form has no place in which they shall sign their acknowledgment and receive a complete for themselves, the same as is

19	A. B. & C. R. R.	19
TRAIN ORDER No. 190....		
To C & E		
At STATION		
(Blank space about 7 in. x 5 in.)		
.....Superintendent		
Conductor and Enginemen must each have a copy of this order		
X-d at.....M.	Repeated at.....M.	Opr.....
Last name in full		
MADE.....	At.....	M.
SIZE OF FORM 7 X 9 INCHES		

required of conductors. The result is that operators do not sign up, or if they do, they write their name in the column headed "Operator," and as a result the "complete" given to an operator is often used by a conductor, who would naturally sign his name on the same line with the operator. The suggested improvements must so readily approve themselves to every one interested that no further explanation seems necessary.

H. W. FORMAN.

THE SANTA FE SHOP SYSTEM.

New York, July 10, 1908.

TO THE EDITOR OF THE RAILROAD AGE GAZETTE:

In your issue of July 10 "Bonus" suggests that the working of the bonus system at the Topeka shops of the Santa Fe is not economical, because some of the stock material which was formerly manufactured at the Topeka shops is now bought from an independent concern at Atchison. "Bonus" and others may be interested in knowing at once the facts which will call for quite a different conclusion than the one suggested by "Bonus," namely—that the Santa Fe betterment methods are uneconomical.

The essential of the methods introduced at Topeka is to establish by careful analysis and study standards of time and cost for every operation, however minute, and then to realize the standards set. During the years 1905 and 1906, at the Topeka shops, standards were established for both repair operations and stock material operations. It was found that

while repair operations were consistently performed on the average at standard cost and in standard time, manufacturing operations often fell far below the standards set. The reason was not far to seek. The prime object of a railroad shop is to effect repairs rapidly, to return locomotives promptly to service. Therefore, at Topeka, even if a stock operation was on a machine, it was often hustled off in a half-finished condition in order to favor some emergency repair job. Stock work might for this reason be interfered with several times before it was completed. As the setting up and taking-down time often takes longer than the mere machine operation, the inefficiency of actual time compared to standard was very great, and the standard costs were correspondingly increased. The actual costs were, in fact, so serious that plans were very carefully considered for the creation of a wholly separate and

31	A. B. & C. R. R.	31
TRAIN ORDER No. 190....		
To C & E		
At STATION		
(Blank space about 7 in. x 5 in.)		
.....Superintendent		
Conductors and Enginemen must each have a copy of this order		
X-d at.....M.	Repeated at.....	Opr.....
INITIALS		
Signatures of Persons Addressed	Train	Made
		At
		Last Name of Opr. Making Delivery
		M
		M
		M
		M
		M
		M
		M
		M
		M
SIZE OF FORM 7 X 11 INCHES		

distinct manufacturing department, which would not be subjected to cost-enhancing and schedule-destructive interruptions.

It is not good policy for railroads to attempt to manufacture what they can equally well buy. As a rule, they do not build, but they buy locomotives; they do not make steel castings, but they buy them; they do not make steel tires, but buy them. The Santa Fe in particular had never operated a gray iron foundry of its own, and after mature consideration had given up its brass foundries. All the gray iron castings for both stock and repairs were cast at Atchison.

The methods of exact determination having proven that manufacturing work could not be carried on economically on the same machines as repairs, and being without foundries, without suitable buildings for expansion, without suitable organization, should the Santa Fe set up a big manufacturing plant, or should it extend its policy of buying finished material? Among my assistants was one who had particular charge of the schedules as to stock work, and another who had charge of standardizing designs. No one knew any better or more intimately than these specialists the causes and effects of mixing manufacture with repair work in a railroad shop.

They, therefore, combined with the founder at Atchison and formed a company to manufacture finished locomotive material, especially that made from gray iron castings.

They knew the actual costs at Topeka, compared to the standards realized without difficulty, when there were no

interruptions; they knew that by the installation of special machines in close proximity to the foundry, with trained men as specialists on one line of work, they would be able to establish time and cost standards lower than those possible at Topeka; they knew that several handlings could be avoided by direct shipment from Atchison of finished supplies; they knew that they could sell to the road at the standard price for labor and material at Topeka, yet owing to their special facilities of continuous production make a manufacturer's profit.

They offered, therefore, to sell to the road certain lines of finished stock material at lower prices than the road itself could manufacture for.

Three courses were open to the Santa Fe:

(1) To continue to manufacture under conditions that greatly increased cost.

(2) To start a big manufacturing plant, including foundry, separate and distinct from the repair shops.

(3) To buy from an independent concern, which from every point of view, was most unusually well equipped to produce exceedingly good and cheap work.

The road decided not to build, provided it could buy more economically than it could manufacture even under standard conditions. The former specialists of the Santa Fe betterment force, in combination with the founder, who, from the inception of the road had supplied it with castings, organized the new company for the production of finished locomotive material, applied to its organization and operation the methods of exact control which had been evolved at Topeka, and, as a consequence, they are, in my belief, able to manufacture at a lower unit cost for labor and shop charges than is reached by any railroad or other machine shop in the country.

It is therefore somewhat amusing to see the Topeka shop methods called in question, because a direct offshoot of the Topeka shop, organized and operated by men for years closely and intimately identified with Santa Fe requirements and work, organized, in fact, to obviate and eliminate unsurmountable Topeka conditions, is able to turn out certain lines of work cheaper than at Topeka.

HARRINGTON EMERSON.
30 Church Street, New York.

Chicago, July 10, 1908.

TO THE EDITOR OF THE RAILROAD AGE GAZETTE:

I think somebody ought to answer the contribution by "Bonus" on the Santa Fe system. Personally I do not believe that railroads ought to attempt to manufacture what they can buy already made. One of the reasons why they do it is that, as a rule, they have no shop cost system. The shop charges up labor and material and a small part of the direct supervision; also sometimes the expense of maintaining its tools, but no charge is made for depreciation on capital invested, for insurance, or for the cost of general supervision. In industrial shops these charges often aggregate as much as the direct charge for labor, yet when I was connected some years ago with a large railroad in this country, the accountant added only 4 per cent. to the direct labor charge to cover all these items and the company was under the impression that it was saving money, because on this basis its tin buckets cost it \$5.00 a dozen, while manufacturers charged \$6.00.

COST ACCOUNTANT.

THE PORTER AND THE NEWS AGENT.

Detroit, Mich., July 10, 1908.

TO THE EDITOR OF THE RAILROAD AGE GAZETTE:

I note with interest your article under "Picked up on the Road" about being let alone by the Pullman porter, and I agree with you that this is a very desirable improvement, and that it will be appreciated; but I do not think that the porter is half the nuisance that the railroad news agent is. I know that the news agent has been abolished on some roads, but still he is often found. A few months ago I had occasion to make a trip from X to Y by day. The train was greatly

crowded, with people standing up all the way, yet there were four good seats covered over with the news agent's supplies and the conductor made no effort to have them removed. Besides this primary nuisance, the agent went constantly back and forth through the crowded aisle and continually intruded himself and his wares upon the passengers. The whole performance cheapens what ought to be first class railroad service.

CONTRACTOR.

RESPONSIBILITY IN THE MATTER OF RATE QUOTATIONS.

Guthrie, Okla., July 10, 1908.

TO THE EDITOR OF THE RAILROAD AGE GAZETTE:

I have read carefully a letter from "F. M. G.," of Pittsburgh, published in your issue of July 3, relative to the above subject, and would ask space to give the other side of the question. It appears to me that he is a rate man, therefore familiar with the tariffs, and naturally it is no trouble for him to ascertain any rate; hence, the law putting the responsibility for a proper quotation upon the shipper does not affect his company.

Texas and Pacific Tariff 8500-H, I. C. C. No. 792 was published some time during the year 1905, and now carries thirteen supplements, all in effect. This tariff originally carried rates from all points on the Texas Southern to Oklahoma points, but during the fall of 1907 a supplement was issued canceling these rates. Supplement No. 174, dated May 24, puts these rates back into effect by merely stating that the rates in effect from Longview, Tex., to Oklahoma points will apply from Texas Southern points. The writer has asked the general freight agents of five trunk lines for a copy of this tariff. In addition, he has personally requested the general managers of two lines to secure a copy. They have all advised that it was absolutely impossible, as the supply of tariff has been exhausted. The writer has also requested of seven agents, at large points in Oklahoma, permission to examine a copy of this tariff, but they have all replied: "There is no copy on file in this office." Should a shipper be held responsible for a rate quoted in this tariff when it is absolutely impossible for him to get the tariff or see a copy of it?

Again, some three weeks ago a gentleman requested a rate from one of the trunk lines on a shipment of live stock, which moved about 140 miles on the line in question and 6 miles on a connecting trunk line. The agent wired the general live stock agent for the rate; it was quoted by telegraph and confirmed by letter, but when the shipment moved, a rate almost double the rate quoted was applied, and on the party asking for a refund, he was advised that the general live stock agent was in error in quoting the rate and only the published through rate could be applied. Should a shipper be forced to suffer for the ignorance and negligence of a man holding the position of general live stock agent of a trunk line? Where the agents are ignorant of the application of the tariffs or do not have the tariffs from which to secure the rate, their mistakes are not their fault, but the fault of the railroad company.

If the law would go further, and say that when a railroad company, through its agents, quotes a rate and the quotation is found to be erroneous and a different rate is applied, the railroad at fault shall be fined an amount not less than ten times the amount of the overcharge, and the consignee shall receive his freight on the bill of lading rate, there would be no question of discrimination, and the railroad companies would supply all stations with complete files of tariffs and see that the men employed as station agents were capable of figuring rates; but as it is to-day, an agent may quote any rate he pleases and the party consummate his trade on the basis of the rate quoted, and at destination the published rate, instead of the rate erroneously quoted, will be applied. The shipper

is not at fault for an error of the forwarding agent; and even if it be his duty to examine the tariff for the rate, it would have been impossible, in the case first mentioned, as the tariff was not available. As most of the tariffs in this western country carry from six to thirty amendments, all in effect at the same time, it is such a mix-up of rates and rulings that no man except one experienced in rates can ascertain what the legal rate on a shipment is.

When the railroads show enough interest in their patrons to provide a complete set of tariffs at every station, and men who are capable of figuring rates and explaining the workings of the tariff, the public will feel more kindly disposed toward them and the agitation for state control will diminish; but so long as a man must guess at the rates in effect, and so long as rates are made by men who are not familiar with the conditions of the country for which they are making rates, and in one case are sticking on "all the traffic will bear," and on the other hand, making it low enough, "so you can get into the market," they must expect the public to ask for state control.

Discrimination must cease, but at the same time, to protect the stability of a contract, quoted rates must be protected and this can only be arrived at by providing a fine for the quoting of an unlawful rate and making it so high that discrimination will be impossible.

C. B. BEE,

Expert Rate Clerk Corporation Commission of Oklahoma.

PREJUDICE AGAINST A REASONABLE ADVANCE IN FREIGHT RATES.

St. Louis, Mo., July 7, 1908.

TO THE EDITOR OF THE RAILROAD AGE GAZETTE:

The railroads want higher freight rates. The people think the present time is inopportune. Which is right?

During the recent years of great prosperity of commercial enterprises in the United States, the transportation lines participated only in the increase in the volume of tonnage; the prices of their services were not increased. Stating the case a little more plainly, they have paid much higher prices for materials and labor and have continued to sell their services at the rates established when both materials and labor were obtained at much lower cost. No manufacturing enterprise could live under such conditions. The transportation lines lived only because of their good credit and ability to borrow money with which to increase their facilities to enable them to carry an increased volume of commerce. It was unwise to continue selling service at former prices, and they now realize it. Some of them exhausted their borrowing capacity, and now feel like resorting to sound business principles and charging for services reasonable rates commensurate with the additional cost of facilities.

The people must understand that the time has come to wipe out old prejudices and assume a friendly attitude toward the railroads, not only because it is necessary to enable the railroads to continue paying present prices for materials and present wages for labor in order to resume their former work of maintenance and increase of facilities, but because it is necessary to protect the people in the pursuance and growth of their business affairs.

Two years ago facilities were inadequate. Indications are that two years hence the volume of commerce will be even larger and will continue to grow. Progressive and far-seeing railroad men know that it is necessary to prepare now for this increased business. The way to do it is to do business on sound business principles, make a reasonable and relative advance in freight rates and see to it that the increased revenues are put to the right use. The people of the United States should welcome instead of discouraging such a move. It is based upon sound economic principles, and when it is realized that the vital question of the growth of our commerce depends upon the prosperity and growth of railroad facilities, and that

the former cannot come in advance of the latter, prejudices on the subject should quickly die.

F. E. KAUFFMAN,

President Bernet, Croft & Kauffman Milling Co.

THE VALUE OF COURTESY BY EMPLOYEES.

Newton, Kan., June 25, 1908.

TO THE EDITOR OF THE RAILROAD AGE GAZETTE:

While all railroad employees are instructed to be courteous to patrons, the fact remains, that to one employee who is paid for courtesy, there are five hundred who are paid only for the work they do, or at least only get credit for their work, and the employee who neglects his work to be courteous to the public not only loses credit for his work, but seldom gets any credit for the courtesy. Injured feelings are often more expensive to a railroad than bodily injury, and for financial reasons should be given the same attention. The merchant who is courteous to his patrons can command a better price than the one with a grouch.

The railroads represent so much wealth, are so large and apparently so lacking in consideration for the individual, that the individual feels small compared to them and as it is not human nature for the weak to sympathize with the strong, it is pretty difficult for the railroads to command public sympathy.

While courtesy should be required of all employees, if the railroads are to have any personality it must come through their station agents, who, as a whole, are in touch with the entire public, and are in a position to make or unmake public sympathy for the railroads. Instead of reducing the traffic department, as some railroads are doing, it should be increased by including all station agents. Put them directly under the jurisdiction of the traffic department, one of the principal duties of which is to be courteous, and they will be allowed full credit for their courtesy, and whenever an agent understands that he will get as much credit for courtesy to the public as he does for his work, he will give it the same attention, and the anti-railroad feeling will soon be reduced to the minimum. But, as long as a station agent is under the jurisdiction of a department whose principal credit is for the most work at the least possible expense, he will be pretty sure to neglect the courtesy in favor of the work, and the public will continue to be out of reach.

A. J. EWING.

THE NEW ENGLAND RAILROAD SITUATION.

BY CLARENCE DEMING.

It has been said, with essential truth, that the railroad situation in New England has for many years represented the principles of radical monopoly, qualified monopoly and non-monopoly. Draw a line east and west through central Massachusetts and the whole region southward, including the states of Connecticut and Rhode Island, and their street railway systems have fallen under the domination of the New Haven company. North of the east and west Massachusetts line and in a less radical sense the Boston & Maine company has control—and without the street railways; and the dividing line referred to may be called the Boston & Albany road, representing ultra-conservatism in the past and non-monopoly in the present. In many aspects, indeed, the Boston & Albany, like the Fitchburg division of the Boston & Maine, may be described as a kind of long bridge, spanning the gap between the main stream of its big lessee, the New York Central on the west and the Boston terminal at the east; and in many, while not all, respects, it is an isolated line, though one by its situation of magnitude, importance and with some potential bearings on the general railroad status in New England.

The triple New England division of railroad systems into monopoly, non-monopoly and qualified monopoly needs, for accuracy's sake, a few modifications. It must not overlook the

fact that in southern New England the policy of absorption by the New Haven has differed decidedly from that of the Boston & Maine. The latter carries many of its lines under lease at a heavy fixed charge and with no set policy of steady merger and consolidation. The policy of the New Haven has been exactly the reverse. Working under the Connecticut statutes, that have conferred large merger power after most of the stock of leased lines has been bought up by the lessee, consolidation has been pushed as fast as possible. It was the general policy of President C. P. Clark, it has been the specific policy of President Mellen. As modifying also the triple division theorem should be mentioned the reach of the Canadian lines into New England and the somewhat important independent road, the Bangor & Aroostook, in northern Maine. Nor should the value of local traffic of the Boston & Albany, including its Boston suburban loop, be omitted as qualifying somewhat its intrinsic character as a "bridge." But these statements merely limit, without changing, the threefold quality of the leading New England railroad systems—south, central and north.

Consolidation has been the inexorable law of American railroads everywhere. But in New England both the geography and the economic conditions give that law a peculiar and exceptional force which artificial resistance may retard but cannot stay. New England is a little intensive corner of the country, highly populated, as a whole, and very highly populated, if northern Maine is excluded. Industrially, it is homogeneous in the sense of being a general and great factory producer. Lumber, quarried stone, products of the field, and the fisheries, of course, have their importance, but the New England factory dwarfs them. In railroad aspects New England sends out high-class freight less in volume, but higher in traffic returns than the raw material and grain which she consumes, and her railroad passenger density is high. Acute short-distance rivalries in a group of small states that contain some eighty cities—and many towns of larger population than the smaller cities—form another primal influence tending to consolidation. Competition by coast lines fed by the railroads is another. Indeed, when all the local conditions in New England are summed up, it seems strange that railroad consolidation in and including her six states has been so long belated. In one form or another consolidation is her manifest destiny, involving to a large degree her street railways as well as the existing steam lines, with a good deal of blending of both, as in southern New England now.

That it will be to her ultimate vantage, even though it spells the hated noun "monopoly," no one who takes the far-sighted and landscape view of the situation can long doubt. Macaulay, in his essay on Frederic the Great, and explaining the intense military organization of his country by that monarch, tells us how it was necessary that Prussia, to resist her powerful neighbors, should be in a marital sense "all sting." In the railroad view somewhat of the same idea fits New England. She has no great through trunk lines of her own, but is a kind of huge terminal for many which, however, have other Atlantic terminals of their own. With scattered railroad forces and interests she cannot, except in local areas of monopoly, influence rates or directions of traffic. She is homogeneous, concentrated with high-class freight to trade for low-class freight. In such a region unity in railroad policy, even at the price of some dangers from consolidation, becomes a kind of fundamental law.

It is a case for centric rather than of distributive forces in the hope of securing competition sure to be transitory.

But, instead of co-operation in New England there has been discord. The railroad policies and statutes of Massachusetts have been antagonistic to those of Connecticut. In Connecticut they have been too lax, in Massachusetts at points too severe. The New Haven Railroad Company has in the past dominated overmuch the legislation of Connecticut and Rhode Island just as the Boston & Maine, until very lately,

has dominated the legislation of New Hampshire. Meanwhile Vermont has recently passed railroad laws as drastic as those of the most radical states of the West or South. In Massachusetts, stirred partly, no doubt, by local jealousy, partly by the influence of federal policy, partly by politics, pure and simple, and partly by the sincere belief of some men in the benefits of railroad segregation and rivalry, there has risen a kind of anti-railroad brain storm, the present outcome of which is, on the face of things, a sad tangle of the merger proposition in the legislature and courts and the early outcome of which hereafter is obscure. On the part of the New Haven Railroad Company it has been due, undoubtedly, in part to too hasty, if not too secretive, action without consultation with the state authorities and too little forecast of public sentiment. On the part of the state it has been marked by singular narrowness of vision, too much of passion, too little regard for fundamental facts and railroad tendencies. It could all have been avoided by a coherent and definite policy on the part of the state recognizing (1) the principle of monopoly, but of a good monopoly acting under precise law, and (2) the natural restraints on New England railroad monopoly of the legislatures of six states, plus public sentiment, sure to be exceptionally strong and assertive against a system on which public convenience and necessity are sensitive terms in connection with an immense passenger business.

To the onlooker in Connecticut, where "monopoly" of the New Haven Company has centered and its features have been most visible, the policy of Massachusetts against the Boston & Maine and the trolley merger seems singularly fatuous, as, in the end, it may be futile. He must wonder how many citizens of Massachusetts recognize the inflexible law of railroad consolidation; how many of them are aware of the improved character of the 50 or more merged roads under "monopoly" in southern New England, especially of subsidiary lines and more notably the rural branches; how many of them have been able to contrast that service as a whole with the vastly inferior passenger service of the Boston & Maine; how many of them have realized the fact that—allowing for low class freight rates on certain acquired lines—the transition downward in those rates has during a decade and a half been greater in the case of the New Haven "monopoly" than of Boston & Maine sub-monopoly or Boston & Albany non-monopoly; and how many recall the recent *voluntary* reduction of fares by the New Haven to two cents a mile on its entire system, forcing reduction of fares also on the Boston & Maine? The attacks on the New Haven road, leveled at watered stock, quite fail to recognize how far the steam system has been dessicated by the acquirement of reorganized lines like the New England, bought in at a low price as compared with first and secondary cost. On the other hand, it is to be admitted that the Connecticut and Rhode Island trolleys acquired reach the highest saturation point in stock watering—but an evil, albeit approaching the dimensions of a public scandal, due to lapses of state legislation and worse lapses of incompetent railroad commissions. In the case of the electric parallels acquired it at least has proved a public benefit by shifting business to the trolleys with more frequent service and at lower rates.

Any analysis of the legal snare that entwines the Boston & Maine and the Massachusetts trolleys must be to the last degree hypothetical. There is the state lawsuit in Massachusetts; there is the federal suit under the Anti-trust act of 1890; there is the Connecticut suit; and two of the three suits may be complicated by legislation next winter in both Connecticut and Massachusetts. He would be bold and self-confident who would predict the legal outcomes of the triple litigation. It may be pointed out, however, that the recent transfer by the New Haven corporation of its Boston & Maine interest to an individual and a Connecticut holder obviously much strengthens its legal case. It brings in questions of personal added to corporation rights, compels proof of "indirect" control—under the Massachusetts statute—upon the plaintiff and

tends also to the raising of an interstate question for the federal court of later resort. It seems not unlikely that the same sort of "personal" transfer may follow, sooner or later, in the case of the Massachusetts trolleys. The Connecticut suit, in effect, aimed directly at validating the New Haven's Massachusetts trolley holding company, is obviously friendly to the former corporation and seems likely later, if pushed, to raise also the interstate issue. It is an unfortunate step if it ends in rousing interstate antagonism and passion, but, in a wider view, desirable if it brings to a legal test the relative powers of the corporation under its charter in two states widely differing in their railroad laws and policies. Of the three suits, that of the federal government under the Anti-trust act, while biggest in its scope and attracting the larger public attention, appears to be the least in practical importance. Whatever the denials it can be stated with assurance that it did not have the approval of President Roosevelt and was sprung upon him by the department of justice prematurely; under earlier pledges, actual or implied, it omits the navigation companies from the complaint, the strongest branch of the case against the defendant corporation—an awkward plight for the government—and the claims of the federal plaintiff are so destructive of general corporation interests that victory for the government would be worse than defeat. The prognosis suggests that the suit will probably be carried over to a new administration and then quietly dropped.

No review of the New England railroad situation is complete without brief reference to the personality of President Mellen, his record, his policy and his aims. Familiarized by actual service as a railroad officer with the systems of both northern and southern New England, he went to the Northern Pacific when that corporation was at a low ebb. He cut down its operating ratios, increased its train load, developed it as a system and left it prospering and popular. Coming back to the New Haven, his problems, as an "old" road and established dividend earner, seemed simple. They, in fact, have proved in the highest degree complex. Mr. Mellen has had to face vexing labor troubles; the task of rebridging and improving the road for bigger train loads and securing new equipment at a time when the demand for railroad material greatly exceeded the supply; the grave question of taking in the dropsical trolleys of Rhode Island and Connecticut; extension of the navigation properties; the enlargement of the Poughkeepsie bridge system and acquisition of the Ontario & Western lines; the development of the New York City terminal, including the main stem electrification below Stamford; and last, but not least, the financial problems of the traffic depression and the merger controversies in Massachusetts. Fill in with the minor elements and such a set of problems crowded into a few years of administration seem well-nigh overwhelming. But the President of the New Haven company, in a policy almost Napoleonic in its reach and speed, has brought to it energy, grasp of both generality and detail, experience and throughout one definite and set purpose outlined in double shape—to conserve by a merger of New England railroad interests the existing dividend of the New Haven's stockholders and "plow in" everything beyond the dividend into the railroad system for the benefit of the public. In the consummation of that policy substantial monopoly of the steam roads of New England is a condition; but it is sure to be a monopoly in the end as popular as it is railroad-wise potential. As one clue to the future when New England's railroad systems and policies are unified may be cited Mr. Mellen's present unpopularity among the trunk line presidents, with the traffic agreement with the Canadian Pacific for the benefit of southern New England as one of its recent exciting causes; and there have been and will soon be others. In this exposition of the Mellen purpose the writer speaks with the certitude of personal knowledge of it and not without some impatience of the opposition that fails to decry it.

The final summary shows the Mellen campaign in upper

New England held up for awhile as regards any formal and legalized merger with the Boston & Maine; many interesting questions and sub-questions raised in the tangle of lawsuits, and the popular and civic side of the long and hot conflict still unsettled. But the practical control of the Boston & Maine rests in parties friendly to the New Haven, which thus secures for the time most of the vantage of control without its responsibilities—a vantage not small in a period of traffic depression. The matter of the Massachusetts trolleys still remains an open and controverted question beset with some dangers in postponing that final adjustment in which the value to New England of a compact and unified railroad system able to dictate externally, while amenable to internal criticism, will be demonstrated—a value in which stockholders and the public will share alike.

THE USE OF SUPERHEATED STEAM IN LOCOMOTIVES.

BY DR. WILHELM SCHMIDT.

PART I.

In the following article it is the author's intention to show in a more or less popular way what can be gained by the use of superheated steam, and to indicate the rules which govern the design of an efficient and economical locomotive superheater. Some personal opinions and experiences must necessarily be included.

Although superheat was tried in the eighteenth century, and more fully by Hirn about 1857, a high degree of superheat was not employed until the author took the matter up. In the year 1892 the author had already built a single-acting stationary engine using steam of about 650 deg. F. He designed several types of reliable superheaters, capable of producing the highest degrees of superheat, and succeeded in so modifying the engine details as to successfully meet all the conditions imposed by the use of steam of very high temperatures. To-day, hardly any large stationary plant is built without employing steam more or less superheated. Out of 196 steam engines, each of more than 500 h.p., connected with electric power plants in Prussia on April 1, 1905, not less than 116 are using superheated steam.

The Prussian State Railways were the first to try the Schmidt system in locomotives, in 1898, and more than 2,700 locomotives, on 83 railroads using highly superheated steam on the author's system, are now in service or in course of construction.

Before entering into the special consideration of the use of superheated steam on locomotives it appears necessary to recall some elementary facts about superheated steam in general.

Saturated steam of a given pressure has a certain known temperature. If heat be added to the steam while it is still in contact with water (for instance, in the boiler), more water will be evaporated, and the quantity of steam will be thus increased, but the saturation temperature remains the same as long as the pressure is kept constant. On the other hand, if heat be taken from it by cooling or by the performance of useful work during expansion, a part of the steam is condensed, and this part loses its capacity as a working fluid. This is the chief source of the losses due to cylinder condensation.

If, however, heat be added to the steam when it is no longer in contact with water (i.e., in the superheater), its temperature will be raised above that due to its pressure; in other words, it will be superheated. Such steam may be cooled in the cylinder by the same amount that it has been superheated in the boiler, without condensation taking place. It is, therefore, only necessary to superheat the steam sufficiently high, and all losses by condensation in the cylinder will be avoided. The volume per pound of steam at the given pressure increases with the temperature in a practically proportional ratio. The higher the degree of superheat, the more

therefore, be quite safe to take the lower limit as a basis for further calculation, and to say, that in ordinary saturated steam locomotives, more than 30 per cent. of the steam furnished by the boiler is lost by condensation in the cylinders.

As far as the losses by leakage are concerned, they are not considerable in the accurately built modern engine, and they will be about 10 per cent. and not more than 15 per cent. of the losses due to cooling. In the present state of our knowledge of the subject, we have no reason to believe that these losses are increased by the use of superheated steam. On the contrary, Callendar, Nicholson and Capper have shown that these losses are actually reduced by the employment of superheated steam, and we shall, therefore, be making an assumption the least favorable to superheated steam if we suppose the leakage losses to be equal in saturated and superheated steam engines alike, and, for the further calculations, take into account only the gain obtained by the avoidance of cylinder condensation. In this respect superheated steam is advantageous in two ways:

1. It is a bad conductor of heat, and hence the interchange between superheated steam and the cylinder-walls will be smaller than in the case of saturated steam.

2. If steam of a sufficiently high superheat is cooled during admission, the only effect will be that its superheat and its volume will decrease; the steam will not, however, condense, but will still remain capable of doing useful work.

As to the first mentioned point interesting tests have been made by Prof. Doerfel, Seemann, Ripper and others, all of which proved that the heat interchange between steam and cylinder rapidly decreased with each increase of superheat.

Prof. F. I. Doerfel found in a certain case that for 25.5 deg. C. superheat the heat interchange during admission amounted to 2106.5 calories, whereas when the superheat was raised to 142.50 deg. C. the heat interchange amounted to only 480.6 calories. Similar results were obtained by Prof. Ripper.* He showed by a series of tests that the heat-exchange during admission becomes smaller as the degree of superheat increases. For equal power and speed of the engine steam of a medium superheat lost one-half, and highly superheated steam only one-quarter of the number of heat units which would have been lost in case of saturated steam. This is clearly another very important point in favor of the higher superheat. In the case of highly superheated steam, the effect of the cooling in the cylinder only consists of a reduction of the superheat of the steam during admission, so that the steam at the moment of cut-off will have a decreased superheat and volume as compared with what it possessed before entering the cylinder. Unfortunately, the temperature of the steam at the moment of cut-off cannot be measured, but it may be estimated that for average conditions highly superheated steam will not lose more than half of the superheat during admission. The temperature of the steam at the end of admission will therefore not be 650 deg. F., but only between 450 deg. and 500 deg., and the gain obtained by the increased volume of the superheated steam will thus be reduced from about 20 per cent., as calculated, to about 10 per cent.

The total economy in water obtained by superheating steam of 170 lbs. pressure to 650 deg. F. will, therefore, be approximately:

10 per cent. on account of the increased volume of the steam.
30 per cent. on account of avoidance of losses due to cylinder condensation, or a total of 40 per cent.

This figure can be considered as a safe average; in actual service, comparing simple engines with and without superheaters, the water economy varies from 25 per cent. to more than 50 per cent.

This great variation in steam economy has its reasons in the different services and the varying cut-offs and speeds at

which the engines are worked; on long continuous runs, where high degrees of superheat can be steadily maintained, the best results are secured. The more the superheater locomotive is forced the higher is the degree of superheat obtained and the more economically the engine works. This is one of the principal differences between the superheated steam and the saturated steam locomotive; the more the latter is pressed the wetter the steam becomes, and the greater, consequently, is the quantity of water carried over into the cylinders and the less economically the engine works.

2. ECONOMY IN COAL.

The economy in coal is generally smaller than the water economy, because a certain coal expenditure is required to superheat the steam, or, to state the case differently, the calorific value of superheated steam is higher than that of saturated steam.

If W_1 be the heat necessary to generate 1 lb. of saturated steam, W_2 the heat necessary to superheat 1 lb. of saturated steam to the temperature t , then the heat required to produce 1 lb. of superheated steam of the same pressure and of a temperature of t deg. F. will be

$$W = W_1 + W_2 = W_1 + c_p (t - t_s) \text{ B.t.u.}$$

c_p being the mean specific heat of the superheated steam under constant pressure.

t_s being the proper temperature of the saturated steam.

t being the temperature of the superheated steam.

The mean specific heat c_p is not constant, but varies with the temperature and pressure.

For example, for 170 lbs. per sq. in. boiler pressure and

$t = 450$ deg. F. 550 deg. F. 650 deg. F.

$c_p = 0.59$ 0.55 0.53

c_p decreases somewhat with the degree of superheat.

In the following Table 2, the values of W_1 , W_2 and W for 1 lb. of steam of 170 lbs. per sq. in. boiler pressure and 450 deg., 550 deg., 650 deg. and 750 deg. temperature are given.

TABLE 2.—Properties of Superheated Steam of 170 lbs. Pressure.

t	B. t. u.			In per cent.	
	W_1	W_2	W	W_2 of W	W_2 of W_1
$t = 450^\circ \text{ F.}$	1,197	44	1,241	3.6	3.7
550° F.	1,197	96	1,293	7.4	8.0
650° F.	1,197	146	1,343	10.9	12.2
750° F.	1,197	195	1,392	14.0	16.3

*The properties of saturated steam are taken from "The Mechanical Engineer's Pocket Book," by William Kent.

The generation of 1 lb. of superheated steam of 650 deg. F. consumes, therefore, 12.2 per cent. more coal than the generation of 1 lb. of dry, saturated steam of the same pressure. These relations are somewhat changed if we take into account the wetness of steam furnished by the boiler, assuming, for instance, 5 per cent. of water suspended in the steam.

Then the heat necessary to generate 1 lb. of saturated steam will only be:

$$\begin{aligned} &\text{steam} \quad \text{water suspended} \\ &(0.95 \times 1,197) + (0.05 \times 350.4) = 1,155 \text{ B.t.u.} \\ &\text{and the superheating of this steam to 650 deg. F.} \\ &\text{will require } 1,343 - 1,155 = 188 \text{ B.t.u.,} \end{aligned}$$

$$\text{i.e., } \frac{1188}{1155} \times 100 = 16.3 \text{ per cent. of the total heat required}$$

for the generation of 1 lb. of wet steam.

In a previous paragraph we calculated a water economy of 40 per cent. in favor of superheated steam of 650 deg. F., and this, in other words, means that if in a saturated steam simple locomotive 100 lbs. of steam are required for a certain amount of work, 60 lbs. of superheated steam would do the same work in the superheated steam locomotive. But the generation of 60 lbs. of superheated steam requires 16.3 per cent. more coal than the generation of 60 lbs. of saturated steam, and, therefore, to do the same work as with 100 lbs.

$$\text{of coal in the saturated steam engine, } 60 + \frac{16.3 \times 60}{100} =$$

70 lbs. of coal are needed in the superheater engine, and,

*See Ripper, "Steam Engine Theory and Practice," page 153.

hence, the calculated coal economy in favor of the latter will be 30 per cent.

In practice such coal economy is not generally obtained, owing to the losses that occur during stoppages and while drifting, which are the same for both types of engines, and also on account of the varying demands made on the boiler and superheater, as these conditions influence the degree of superheat. But as a safe figure, obtained in comparative service of simple locomotives with and without the Schmidt superheater, 25 per cent. coal economy can be relied on as an average, and this figure will, therefore, be taken as the basis for the calculation of the increase in hauling power.

3. HAULING POWER.

In addition to the already discussed reduction of steam and coal consumption, the use of superheated steam in locomotives effects a large increase in the hauling power of the engine.

In the foregoing paragraphs it has been shown that, when highly superheated steam is used, a two-cylinder simple locomotive consumes on the average 25 per cent. less coal than a two-cylinder simple engine of the same dimensions, but using saturated steam. Therefore, 75 lbs. coal in the superheated steam locomotive will do the same work as 100 lbs. coal in the ordinary simple engine.

If, now, 100 lbs. are consumed in the superheater locomotive, there will be an increase in indicated horse-power of

$$\frac{(100 - 75)}{75} \times 100 = 33 \text{ per cent.}$$

in favor of the superheated steam locomotive. The actual gain in tractive power, measured at the draw-bar, will be still greater.

At the ordinary speeds of express trains, about 40 per cent. of the total indicated horse-power is absorbed by the running

It is, of course, assumed that the cylinders are large enough to deal with the quantity of steam gained by the elimination of condensation, and, above all, that the predetermined high degree of superheat is regularly maintained. The higher the superheat, the more economical and efficient the engine will be; this is a statement which every engine driver who has run a locomotive using highly superheated steam will confirm.

Manifestly, the material increase in the total hauling capacity of the locomotive gained by the use of highly superheated steam, may be applied either to the working of heavier trains or to the attainment of higher speeds.

Superheating thus forms an efficient means for meeting in a very economical way the steadily increasing demands for more powerful locomotives, without having recourse to abnormally heavy and complicated engines. The application to new or existing locomotives of an efficient superheater, capable of producing and maintaining a high degree of superheat, is tantamount not merely to a considerable increase in boiler capacity, but also to a substantial augmentation in the haulage capacity of the engines.

(To be continued.)

GRAVITY MEASURING COAL CHUTE.

In the design of the coaling station of the Washington, D. C., passenger terminal, two important conditions had to be considered. The different roads use different fuels and the terminal company had to have a check on the amounts of fuel given to the separate roads. These requirements led to the adoption of the gravity measuring coal chute, shown in the illustrations. This style of chute was known to the Baltimore & Ohio management because it had been in use at several



Gravity Measuring Coal Chute; Washington Passenger Terminal.

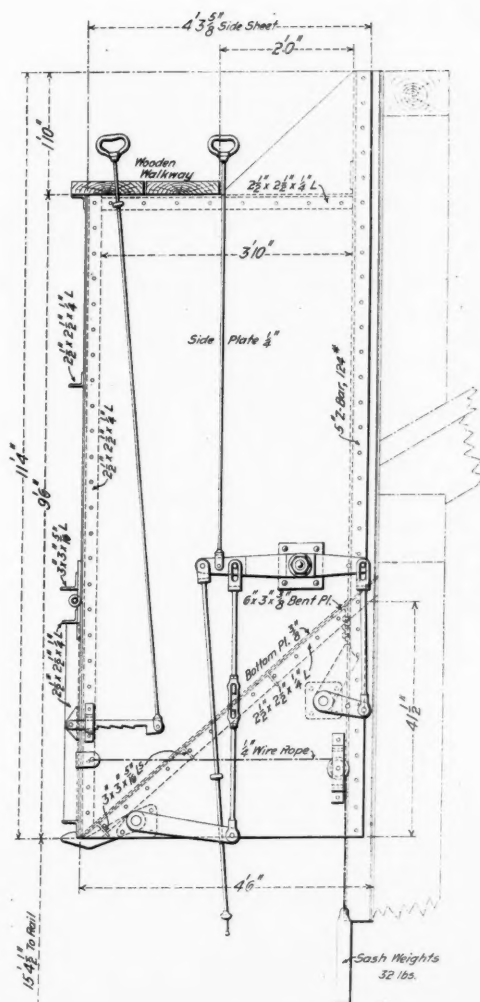
resistances of engine and tender, leaving only 60 per cent. of that power to be transmitted to the tender draw-bar. Consequently, an increase of 33 per cent. in the indicated horse-power represents a gain in draw-bar-horse-power of

$$\frac{33 \times 100}{60} = \text{about } 55 \text{ per cent.}$$

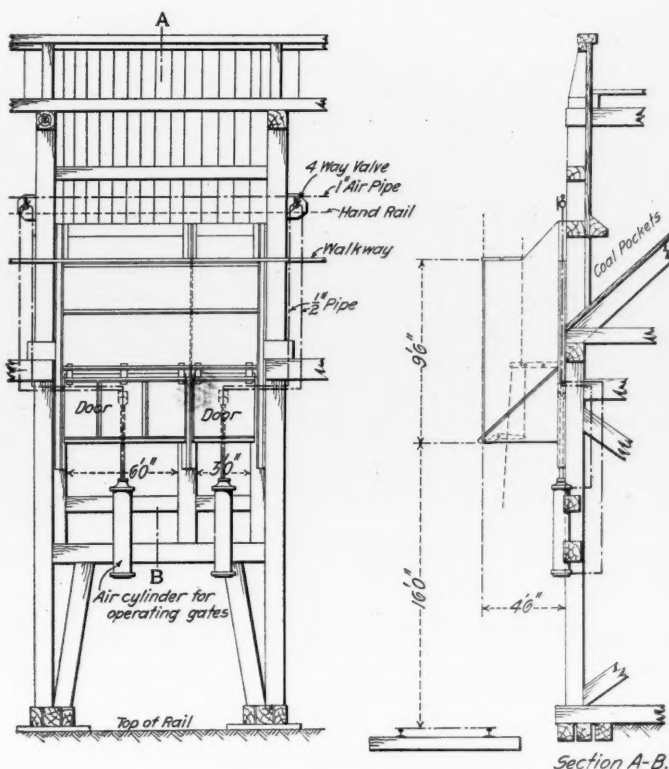
The higher the speed is the more pronounced will be the increase in tractive power.

points on that road. Final acceptance of the design by the Washington Terminal Co. depended on the decision of the engineers representing the Pennsylvania Railroad. This decision was favorable, after a thorough investigation of the service rendered, both as to economy and maintenance, by the similar chutes on the B. & O.

Under normal conditions, the plant serves the engines of 200 trains each day, its capacity being such as will meet the



Detail of Coal Pocket.



Part Elevation and Details.

increased demand in times of special events, such as inaugurations, etc. The gravity measuring coal trestle has both storage and delivery pockets. The storage pocket has a capacity of 60 tons, and the delivery pockets, arranged in pairs, contain two and four tons each. This latter size measures a sufficiently small unit of coal. The storage capacity of this design of coaling trestle may be greatly increased by handling the coal from hopper-bottom self-dumping cars. These may be placed on the trestle, the hopper doors opened, and the coal allowed to run from the cars as the storage and measuring pockets are emptied. Enough coal may be stored in this way to require but a single switching of the trestle during 24 hours.

As the photograph shows, the coal chute is of steel construction throughout, making it a permanent structure. The drawings show the relative sizes and positions of the coal pockets, as to each other and the coaling track. Vertically moving gates, pneumatically operated, permit the passage of coal from the storage to the delivery pockets. A system of interlocking and shut-off gates with the delivery valves prevents the delivery of coal while the gates of the storage pockets are open. The delivery pockets may be emptied and filled in less than one minute. There is no manual handling of the coal and the operation of a chute of ten pockets requires the labor of but two men.

The Gravity Measuring Coal Chute Co., Richmond, Va., either builds these chutes or furnishes plans and specifications under a royalty agreement.

PICKED UP ON THE ROAD.

BY GULF.

If we read between the lines of the report and accept the positive statements made in the discussion on cast iron wheels at the last Master Car Builders' Convention, as well as what has come out since, it is safe to conclude that there is some doubt as to the advisability of using such wheels under cars of 100,000 lbs. capacity. The data given as to the strength of the flanges to resist rail pressures is new, and the experiments that were roughly outlined should be carried out to the end in order that clear cut definite results may be obtained, and this should be supplemented by investigations as to the stresses that are put upon wheels when passing curves of different radii, through a wide range of speeds and while carrying various loads. As it was stated in the topical discussion, the wheel is put into service without the slightest idea of the amount of work that it has to perform or whether it has the strength to do it, except that based on the old rule of thumb, that it has not failed except under heavy loads, and a hope that the last wheels applied will be all right. The only light on the matter is that regarding the strength of flanges, and this has been found to vary from 47,000 to 116,000 lbs., according to the type of wheel and the character of the metal. What should now be done is to carry such an investigation as that outlined above for the determination of wheel stresses in service. This would require some time, but the apparatus is neither complicated nor expensive. The preliminaries of such an investigation have been made, and it is to be hoped that the means will be found to continue them until the data needed for an intelligent understanding of the subject has been obtained.

We hear much at all times and in all places regarding the variables that enter into all matters of railroad operation, and of the impossibility of applying any specific formula to any wide range of operations, whatever they may be. It would seem that this should hold true regarding the guarantees that are asked and offered on cast iron wheels. To be sure, when these wheels are under freight equipment they may travel from one end of the country to the other, but since the adoption of the per diem system of accounting, cars are

more apt to make the majority of their mileage on the home road. If this is the fact, it would seem reasonable that roads having a clear level track should get a greater mileage out of their wheels than those among the mountains or on sandy plains. In both these latter cases, the wear is perceptibly faster and the service more severe with a corresponding decrease in the life of the wheel. But to the outside layman it does seem as though it would be a rather difficult job to adjust the guarantee so as to be fair to all interested parties.

W. C. BROWN ON PROPOSED RATE INCREASE.

The following extracts are from a reply by W. C. Brown to a protest against the suggested increase in freight rates, addressed to W. H. Newman by James T. Hoile, Secretary of the Manufacturers' Association of New York:

"I wish to call attention to the following quotation from your letter:

"The present basis of rates between Chicago and New York, which governs rate making in the territory mentioned, has been in effect for 30 years and has never been raised or reduced in all that time, although in the meantime we have had panics and business booms."

"I beg to say, and later in this communication will endeavor to demonstrate, that you are in error in your impression that there has been no reduction in freight rates in the territory between Chicago and New York during the last thirty years; but for the sake of argument we will assume that there has been no increase or decrease during that time, and upon this premise, I believe I can convince you and every member of your association that in view of all the circumstances the railroads are entitled to a very substantial increase in freight rates.

"In the first place, the average wage paid to railroad employees has, in the last 15 years, shown an increase of from 33½ to 50 per cent. The average cost of almost every class of material that railroads consume in tremendous quantities each year has increased from 50 to 100 per cent.

"To illustrate, I desire to call your attention to the following increases which have occurred during the last ten years, and a comparison of the prices of 1898 with those of 1878 would, with the exception of steel rails and possibly two or three other items, show a still further increase. During the 10 years from 1898 to 1908 there have been the following increases in the cost of material:

	Per cent.		Per cent.
Angle bars	50.0	Bridge timbers	80.0
Gray iron castings	37.5	Cross ties	76.0
Malleable iron castings	21.3	Car siding	90.0
Bar iron	42.8	Locomotives	68.3
Cut nails	95.4	Box cars	72.8
Wire nails	45.6	Car axles	51.0
Cast iron pipe	87.8		
Steel rails	47.3	Locomotive Steel Forgings.	
Track spikes	25.9	Crank pins	105.0
Cast iron car wheels	25.0	Piston rods	57.0
Barbed wire	32.0	Main and side rods	28.0

"This list could be increased to include almost every item of material used by the railroads.

"Taxes have increased from an average of \$179 per mile to an average of \$349 per mile, or approximately 95 per cent.

"Generally these increases have been gradual, and have been offset in some measure by increased tonnage and increased efficiency, resulting in decreasing the unit cost of transportation. During the last 18 months, however, the following tremendous increases have come in leaps and bounds, and the converging lines of cost and compensation in railroad operation, which for years have been steadily approaching each other, have been suddenly brought so close together as to alarm shareholders and investors, and it is certain that, in order to pay fixed charges, taxes and operating expenses, with even a very moderate return to shareholders, there must be either a moderate increase in freight rates or a very substantial reduction in wages of railroad employees.

"Becoming effective during the early months of 1907, in-

creases in pay of railroad employees approximating \$100,000,000 per annum were made.

"This increase was not voluntary on the part of the railroads, but was the result of weeks of conference between representatives of the roads and those of the employees, and finally of intermediation by Chairman Knapp of the Interstate Commerce Commission and Commissioner Neal of the Bureau of Commerce and Labor."

Referring to the suggestion that wages be reduced Mr. Brown said:

"Union labor was never so well organized, never so united and never so abundantly able from a financial standpoint to oppose what they would honestly believe to be an uncalled-for reduction, and organized railroad labor would have the united support of every department of organized labor of the nation.

"The credit of the railroads has been injured largely by the growing and well founded conviction on the part of the investing public that on the present basis of cost of operation and compensation for service rendered, the permanent payment of interest on bonds, to say nothing of a fair return upon the money invested by shareholders, is extremely uncertain.

"How well founded this conviction was, and is, may be best illustrated by calling your attention to some illuminating but extremely startling figures.

"The tremendous increases in expenses which I have referred to in detail became effective at successive dates during the first half of the year 1907, and I have looked up the statement of about 80 per cent. of the principal railroads of the country and find that during the last half of the year (after all the increases had become effective) gross earnings of the railroads increased \$57,413,078 over the same period of the preceding year, their expenses increased \$80,235,823, while, despite the tremendous increase in tonnage handled and gross earnings, net earnings decreased \$22,822,745. This showing was not the result of any depression or falling off in tonnage. Traffic was moving in unprecedented volume. Furthermore, the condition which these figures reflect is even more serious than is indicated on their face."

There is hardly an operating official on any of our railroads who did not recognize the fact very early after the taking effect of these large increases, that the most drastic methods of retrenchment and economy would be necessary to offset in part the sudden and tremendous increase in operating expenses, and many of the economies adopted during the last six months of 1907 passed far beyond the line which divides true from false economy. Yet, in spite of these extreme measures of retrenchment, the startling loss in net revenue resulted.

These are general and somewhat indefinite figures, in that they do not refer to particular roads, and, in further corroboration, I call attention to the following specific cases covering principal roads representing all sections of the country. The figures cover the last six months of the year 1907.

The Union Pacific Railroad, with an increase in gross earnings of \$3,855,646, shows an increase in operating expenses of \$5,282,877, due to the tremendous increase in cost of material, pay-rolls, etc., making a decrease in net earnings of \$1,427,231, as compared with the same period of the preceding year.

The Erie Railroad, with an increase in gross earnings of \$596,430, shows a decrease in net of \$2,636,694.

The St. Louis & San Francisco Railroad, with an increase in gross of \$2,092,061, shows a decrease in net earnings of \$1,546,273.

The Santa Fe Railroad, one of the best managed roads in the United States, with an increase of \$2,986,818 in gross earnings, shows an increase of \$6,555,351 in operating expenses, making a decrease in net earnings of \$3,568,533.

The Southern Pacific Railroad, with an increase in gross earnings of \$6,975,042, shows an increase in operating expenses of \$11,245,788 and a decrease in net earnings of \$4,270,746.

The Pennsylvania Railroad East of Pittsburgh, with an increase of \$7,258,400 in gross, shows an increase in operating

expenses of \$8,921,900, making a reduction in net earnings of \$1,663,500.

The New Haven Railroad, with an increase of \$1,194,183 in gross earnings, shows an increase in operating expenses of \$2,516,196, making a decrease in net earnings of \$1,322,013.

The Missouri Pacific Railroad, with an increase in gross earnings of \$478,698, shows an increase in operating expenses of \$2,187,911, making a decrease in net earnings of \$1,709,214.

The Louisville & Nashville Railroad, with \$815,877 increase in gross and \$2,542,766 increase in operating expenses, shows a decrease in net earnings of \$1,726,899.

The gross earnings of the New York Central Railroad increased \$2,227,621, while operating expenses show an increase of \$3,866,752, making a decrease in net earnings of \$1,639,131.

In giving these figures I have tried to select railroads representing fairly all sections of the country. They show that operating expenses increased about 60 per cent. more than gross earnings, indicating that no increase in volume of business will make good the tremendous increase in expenses, and demonstrate clearly that there must be secured an increase in net earnings by a moderate increase in freight rates or a decrease in expenses by a substantial reduction in pay.

During the first quarter of this year the New York Central lines, traversing as they do, the most populous and most prosperous sections of the United States, have but little more than earned their fixed charges, making scant provision for dividends and none whatever for betterments. Two of them—the Cleveland, Cincinnati, Chicago & St. Louis and the Lake Erie & Western—located in the garden of the United States, and serving some of the largest and most important cities in the country, have passed from the list of dividend-paying roads.

The reports from hitherto prosperous railroads located in and serving every portion of the United States, show that this condition is universal.

Dividends of the most prosperous railroads are being reduced, and on others entirely suspended. Other roads, unable to earn their operating expenses and fixed charges, are being placed in the hands of receivers.

The first effect of this condition was to close the usual sources from which large sums of money have heretofore been readily available for necessary improvements by the sale of long time, low interest-bearing bonds, and to force the railroads to resort to short-time notes bearing high rates of interest, absorbing all the available funds of the banks, making it difficult, and in many cases impossible, for other business enterprises to borrow money at all, and forcing interest rates for all to an almost prohibitive figure.

This condition will be repeated the moment the railroads attempt to resume the purchase of equipment in large quantities, or the great work of improvement which was interrupted by the panic, unless the credit of the roads can be restored, enabling them to sell securities of long tenure at a reasonable price and bearing a reasonable rate of interest. It is perhaps unnecessary to say that this resumption can never come except by such restoration of credit, and I do not believe such restoration of credit can be brought about save by an increase in railroad rates, which will promise a revenue sufficient to make railroad securities a reasonably dependable investment.

This was the effect of these sudden and tremendous increases in expenses on the railroads. Consider for a moment the effect upon nearly every other class of business in the country.

During the year 1907 the New York Central lines paid out to car and locomotive manufacturers in the United States more than \$31,000,000, almost every dollar of which was paid out for labor in some form or other.

During the year 1908, with the exception of a comparatively small number of locomotives, not a dollar will be expended for this purpose; and this record is being repeated by almost every railroad in the country.

Nearly \$11,700,000 was expended during the year 1907 for rails and ties. During the present year less than half this amount will be expended.

During the year 1907 approximately \$32,000,000 was expended by the New York Central lines alone in reducing grades, improving alignments and providing second, third and fourth tracks. At the present time, from the Atlantic to the Pacific and from the Gulf to the Great Lakes, work of this character is almost entirely suspended.

If the railroads could resume the purchase of equipment and material and the great and vitally necessary work of improving their facilities the present depression would, in my opinion, vanish in a day, and the re-employment of the hundreds of thousands of idle workmen would, by their purchasing power, start running to their capacity thousands of idle manufacturing plants all over the land. I believe these results would very speedily follow the taking effect of the suggested increase in freight rates.

The effect of a moderate increase in railroad rates, accepted by the public and approved by the Interstate Commerce Commission, in restoring confidence in railway investment would do more to put in motion the wheels of industry and start the country upon a new era of prosperity than anything else that could possibly be done.

As before stated, my argument has been on the assumption that you were correct in your statement that the rates have not been either raised or reduced in the last thirty years, and if this was the case, in view of the tremendous increase in cost of producing the commodity of transportation, which the railroads produce and sell, I do not believe that any fair-minded man—giving the matter careful, unprejudiced consideration—can reach any other conclusion than that the railroads are entitled to a substantial increase in freight rates.

I beg to state, however, that you are in error in your statement that there has been no reduction in freight rates during the last thirty years.

The following were the class rates in effect between New York and Chicago in 1877, compared with 1908:

	Eastbound.		
	1877.	1908.	Decrease, per cent.
First class	\$1.50	\$0.75	50
Second class	1.10	.65	41
Third class .....	.85	.50	41
Fourth class .....	.40	.35	12½

(In addition there are the fifth and sixth classes, which were not in existence in 1877, which taken a rate of 30 and 25 cents per 100 lbs. respectively, and include many articles which before took the fourth class rate of 40 cents.)

	Westbound.		
	1877.	1908.	Decrease, per cent.
First class	\$0.75	\$0.75	..
Second class .....	.70	.65	7
Third class .....	.60	.50	17
Fourth class .....	.45	.35	22
Fifth class .....	.35	.30	14

(And a sixth class has been established, which takes a 25-cent rate, and which includes many commodities which formerly took the fourth and fifth class rates.)

The rate on grain and flour from Chicago to New York during this period was as follows:

	Wheat.	Corn.	Flour.
1877.....	\$0.35	\$0.35	\$0.35
1887.....	.25	.25	.25
1897.....	.20	.15	.20
1908 (domestic).....	.16	.16	.167
1908 (export).....	.13	.13	.14

These figures show that the rate on wheat and corn for export was 270 per cent. higher in 1877 than in 1908, while on flour it was 250 per cent. higher.

It is true that class rates do not show anything like the ratio of reduction that is shown on farm products east bound, but it is also true that the fact that the railroads have made these tremendous decreases in rates of freight on farm products has been one of the most potent influences in the upbuilding and prosperity of the great agricultural West and Middle West, and this prosperity has been the foundation on which the great manufacturing industry of the United States has been built, and upon which the future prosperity of the manufacturing business of the nation must depend. I have written you at great length because I appreciate fully the

importance of the Manufacturers' Association of New York and the influence it will exert in the settlement of this question.

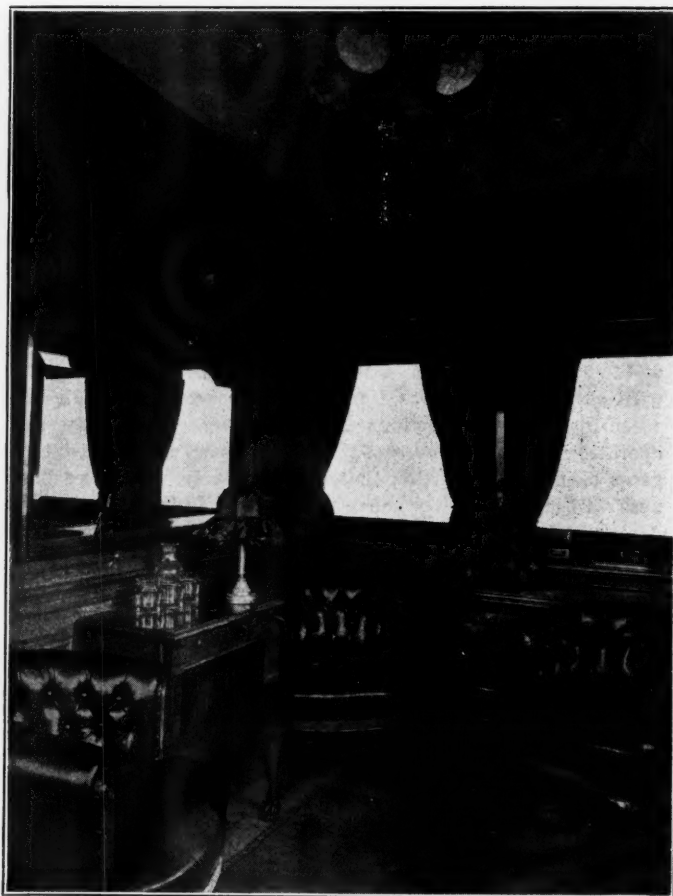
GOVERNMENT REGULATIONS FOR THE TRANSPORTATION OF EXPLOSIVES.

Under authority of the act approved May 30, 1908, requiring the Interstate Commerce Commission to make regulations for the safe transportation of explosives, including packing, marking, loading and handling while in transit (*Railroad Age Gazette*, June 26, page 395), the Commission has made public the regulations which it has adopted. These regulations become effective three months hence. Violation is punishable by a fine of \$2,000, or imprisonment for 18 months.

The regulations adopted are in the main those of the Bureau for the Safe Transportation of Explosives (American Railway Association), which were printed in the *Railroad Gazette*. (See Nov. 8, 1907, and April 10, 1908.) A public hearing was held in Washington on June 29, as a result of which the rules formulated by the railroads were, to some extent, modified by the Commission upon the basis of representations made by manufacturers of explosives, but, we understand, not in any important feature. The Commission may at any time, of its own motion or upon application of any interested party, change or modify the regulations now prescribed.

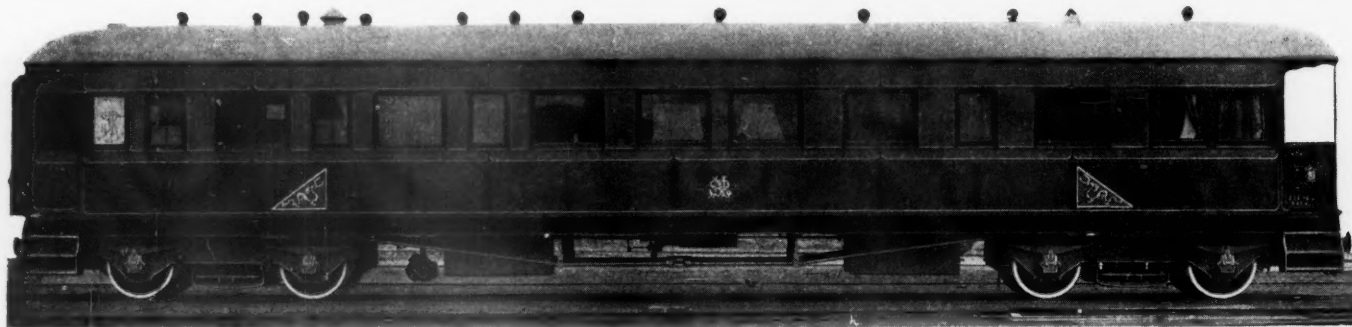
NEW ROLLING STOCK, SHANGHAI-NANKIN RAILROAD.

The accompanying illustrations give a good idea of the luxurious equipment of the new passenger cars built by the Metropolitan Amalgamated Carriage & Wagon Co., Ltd., at the Saltley Works, Birmingham, Eng. Two cars have been built, one 68 ft. long, a composite dining, sleeping and drawing room car, the other 52 ft. long, being for the exclusive use of the chief officers of the railroad. A combination of English and foreign practice has been followed in the design of these cars, the external paneling and molding following British practice, while the arrangement of the windows and the method of bracing the body sides are similar to the usual methods employed in other countries. The outside panels are of polished steel, and the moldings and body framing



Observation Compartment, 68-ft. Car.

ished quartered oak panels and oak fasciæ and moldings. A partition provided with three beveled mirrors, a small reading table, an electric reading lamp, a water bottle and holder, divides the observation from the other compartments. The fittings are decidedly luxurious, including four polished oak chairs upholstered in red buffalo hide, a green Axminster carpet, tapestry curtains of the same color, with ivory rings and



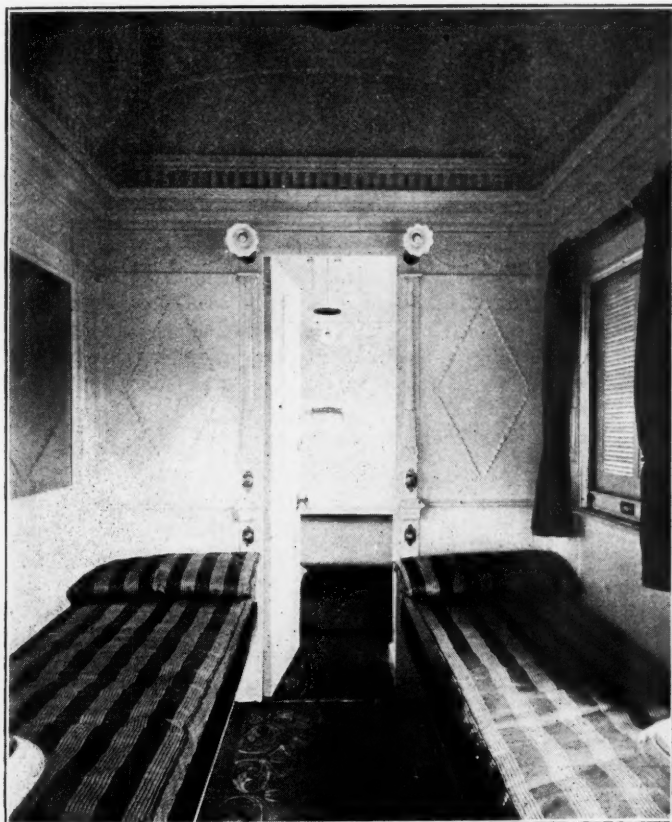
New 68-ft. Car; Shanghai-Nankin Railroad.

are in teak wood. The interior finish and decoration are on somewhat novel lines, no recognized period or style of cabinet work having been adopted, and the result is striking in character. One object kept in view throughout was to make these cars entirely self-contained, each comprising dining, sleeping, bath room and lavatory accommodation, together with a kitchen and attendants' compartments.

A noticeable feature of the large car is the observation compartment. This is 6 ft. 7 in. long, and occupies the full width of the car. There are two large windows at each side and two at the end of the compartment, a door 2 ft. 6 in. wide, giving access to an open platform. The walls have pol-

oxidized silver poles and brackets, and a four-light electrolier. Other additions to "passenger comfort" comprise match boxes and holders, bell communication with the train attendants, and a large exhaust ventilator. A polished teak corridor, 2 ft. 3 in. wide, leads from the observation compartment to the dining room, passing the lavatory and the state room.

The dining room, which is approximately in the center of the car, is 10 ft. 11 in. long, and finished entirely in polished mahogany. Semi-elliptical pilasters, with massive carved capitals and carved trusses, support the cornice, and two large windows are arranged between the pilasters on each body side. Each partition supports two beveled mirrors. The table and



A Bedroom 68-ft. Car.

chairs are of polished mahogany, the chairs being upholstered in blue buffalo hide. The floor is covered with a scarlet Axminster carpet, curtains of the same color being arranged over the windows. The ceiling is domed like that of the observation compartment, and in addition to the central electrolier, four small single-light pendants are fixed at the corners of the center panel frame. Communication with the attendants is obtained by means of push buttons fixed at the corners of the table. A small glassware cupboard occupies a corner of the room. Four doorways give access to other parts of the car, one corridor, as already mentioned, leading into the lavatory and observation compartments, and the other into the bathroom, kitchen and attendants' compartment. Sliding doors, hung on Crittall anti-friction bearings and guides at the bottom with noiseless shoes, communicate with the state room and the bedroom.

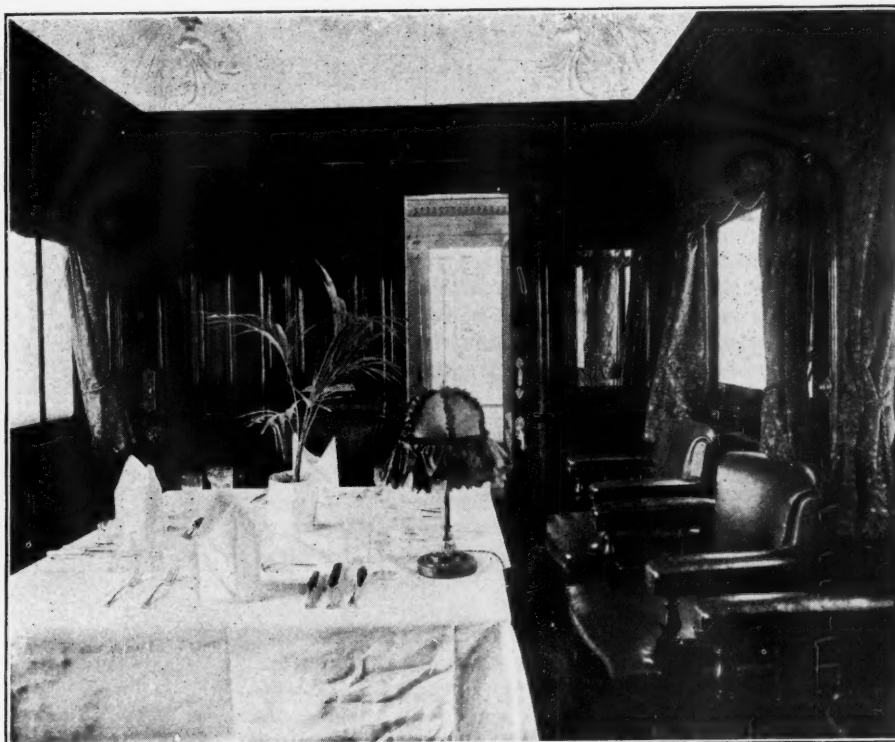
The state room is 11 ft. 10 in. long and 6 ft. 10 1/4 in. wide. Sleeping accommodation is provided for two persons in lower berths and the same number in upper berths. As this compartment will be used for both day and night travel, the lower berths have the appearance of ordinary seats. The upper berths are paneled on the under side and can be hinged vertically against the partitions. The interior framing and lower panels of the room are of polished American walnut, the upper panels being of sycamore. Two chairs and a movable table are provided, with green buffalo hide upholstery, the curtains and carpet being green and scarlet. Illumination is

by a large electrolier and a small table lamp, and half-light switches are provided for night use.

The bedroom is 7 ft. long and 6 ft. 10 1/4 in. wide, and is finished in pure white, the only colors introduced being in the curtains and carpet. Two windows 2 ft. in width, are provided at the body side, and two beveled mirrors are fixed on the opposite corridor partition. The walls are covered with stippled millboard panels with lincrusta ornamentation. The beds are supported on wire spring mattresses, cupboards for the bedding being arranged underneath, and a small table, with water bottle and glass holder, together with push buttons, is provided at the foot of each bed. The lighting is by four single lamp brackets. A hinged door opens into the bathroom, which is of the same dimensions as the bedroom, and contains a full-size bath, folding lavatory basin, hopper with flushing cistern, hat pegs and other toilet conveniences, including a small dressing table. Hot water is supplied from a tank at the side of the kitchen stove. The large lavatory contains a filter and a large wardrobe, in addition to the usual fittings.

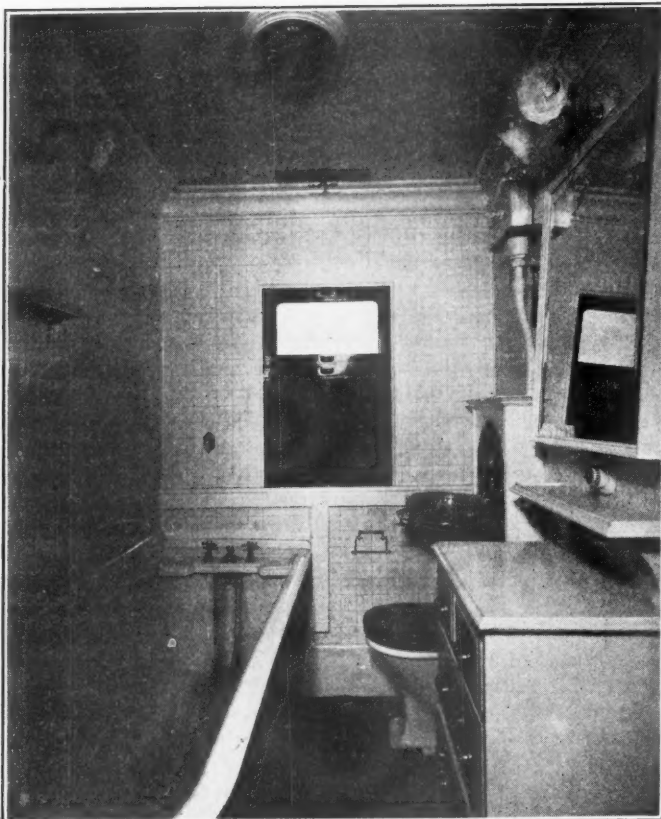
The kitchen is 6 ft. 7 1/2 in. long by 6 ft. 10 1/4 in. wide, and is provided with a coal-burning stove, hot water tank, ice boxes, etc., in addition to the usual appliances. In order to minimize the risk of fire the floor is covered with steel plates, and the partition behind the stove is lined with asbestos secured behind steel. The ceiling, which is similarly lined, is built in sections, in order to give access to the water tanks situated between it and the roof. The attendants' compartment is 5 ft. 6 1/4 in. long. It contains a small lavatory compartment and is provided with cushioned seats, berth accommodation, parcel rack and movable table.

The "Stone" combined heating and ventilating system is



Dining Compartment, 68-ft. Car.

installed throughout this car and the officers' car. In this system steam is taken direct from the locomotive and carried through ducts at the sides of the car, after passing through heating coils. A perforated zinc air collector is fixed at the top of the roof, and the air, after being filtered in its passage through a cocoanut fiber mat floating in a tank of water, enters tubes leading to the heating coil ducts. Electrically-driven fans draw in the pure air and force it over the heating coils



Bathroom 52-ft. Car.

and through the ducts. Any desired temperature can be obtained by means of a regulating cock.

The 52-ft. car consists of a living room and secretary, engineer's, bath, kitchen, servants' and lavatory compartments, and platforms. The living room is 11 ft. 3 $\frac{3}{4}$ in. long, and occupies a position at one end of the carriage, end windows being provided. A hinged door connects it with an open platform. The furniture comprises a couch, which may be extended for use as a lounge, dining table, four upholstered chairs and a mahogany sideboard. The partition separating this room from the other compartments is fitted with cupboards, drawers and beveled mirrors. The entire wood finishing is of polished mahogany. The upholstery is of green buffalo hide, the Axminster carpets and tapestry curtains being of scarlet.

The ceiling is similar in design and ornamentation to that of the dining room of the saloon carriage. Access to the two compartments situated next to the living room is obtained through a corridor, the walls of which are finished in polished teak. These compartments are for the personal use of the chief officers of the line. Each contains a rolltop desk, an office chair, and an assistant's table and stool, and upholstered seats 6 ft. 10 in. long which are convertible into sleeping berths. One compartment is also provided with an upper berth similar to those of the state room. The other compartment has a cabinet lavatory and a beveled mirror. Both are lighted with electroliers and table lamps. The bathroom, kitchen and servants' compartments are arranged and finished in the same manner as those of the 68-ft. car.

The bodies are carried on steel underframes, constructed of rolled sections, held together in the usual manner with knees and gusset plates, and stiffened by diagonal bracing. The solebars and longitudinals are of 10 in. by 4 in. by $\frac{7}{8}$ in. channels. The bolsters are built up of plates and angles, being increased to 12 in. deep in the center to take the end longitudinals, which are 12 in. by 4 in. by $\frac{7}{8}$ in. channel. The end longitudinals are arranged to take the standard type of draw and buffing gear, which consists of a central type of automatic

coupler, combined with a spring bumping plate situated below the coupler. The length over the headstocks for the large car is 68 ft., and for the small one 52 ft. Both frames are 9 ft. 5 in. wide over solebars, and are strongly trussed with 1 $\frac{3}{4}$ in. diameter truss rods, queen post system. The dynamo and accumulator boxes are suspended in the usual manner from the crossbars.

The trucks are built up of plates and angles, and follow the standard practice of the railroad company, except that the bolster springs are fitted with McCord's patent dampening arrangement. In addition to the bolster springs, they are provided with laminated springs over each axle-box, suspended through auxiliary bearing springs of spiral pattern. The cars are equipped with the Westinghouse air brake, provided with the improved type of triple valve. The brake blocks act on both sides of all wheels.

The leading dimensions are as follows:

	68-ft. car.	52-ft. car.
Length over corner pillars.....	61 ft. 2 $\frac{1}{4}$ in.	45 ft. 2 $\frac{1}{4}$ in.
Width over panels.....	10 "	10 "
Rail level to top of roof.....	13 " 11 $\frac{1}{2}$ "	13 " 11 $\frac{1}{2}$ "
Rail level to floor.....	4 " 5 "	4 " 5 "
Floor to under cant rail.....	7 " 1 "	7 " 1 "
Wheel base.....	47 "	31 "
Bogie wheel base.....	9 "	9 "
Diameter of wheels on tread.....	3 " 6 $\frac{1}{2}$ "	3 " 6 $\frac{1}{2}$ "
Center to center of journals.....	6 " 6 "	6 " 6 "
Size of journals.....	9 in. x 4 $\frac{3}{4}$ in.	9 in. x 4 $\frac{3}{4}$ in.
Gage.....	4 ft. 8 $\frac{1}{2}$ in.	4 ft. 8 $\frac{1}{2}$ in.

The metal furniture used throughout the cars is silver oxydized and relieved, except in the servants' and kitchen compartments, where copper similarly treated has been used. In order to muffle the transmission of sound, the floors are constructed of two layers of boards placed 1 $\frac{3}{4}$ in. apart, the intervening space being filled with well-rammed teak sawdust. The drop windows and the venetian frames are supported by "Laycock's" patent window balancers. Stone & Co.'s system of electric lighting is installed. The outside panels of the cars are painted, the upper ones in Chinese yellow, and the lower ones are grained in representation of teak. These panels carry transfers of the monogram of the railroad, and also



Office in 52-ft. Car.

the Chinese arms. The cars are fitted with combined automatic couplers and centralizing buffers, of the type standard for this railroad, and designed by the consulting engineers.

For the foregoing particulars and photographs of these new cars we are indebted to the consulting engineers to the Shanghai-Nankin Railroad, Sir John Wolfe-Barry and A. J. Barry, and the rolling stock builders, the Metropolitan Amalgamated Railway Carriage & Wagon Co., Ltd., Saltley, Birmingham, Eng.

TRAIN ACCIDENTS IN JUNE.¹

Following is a list of the most notable train accidents that occurred on the railroads of the United States in the month of June, 1908. This record is intended to include usually only those accidents which result in fatal injury to a passenger or an employee or which are of special interest to operating officers. It is based on accounts published in local daily newspapers, except in the cases of accidents of such magnitude that it seems proper to write to the railroad manager for details or for confirmation.

Collisions.

Date.	Road.	Place.	Kind of		No. persons reported—	
			Accident.	Train.	Kil'd.	Inj'd.
11.	Balt. & Ohio	Uniontown.	xc.	P. & Ft.	1	12
18.	Wabash	Pendleton, Mo.	bc.	P. & Ft.	0	10
20.	Mo., K. & Tex.	Sedalia.	bc.	P. & Ft.	0	4
22.	La. R. R. & Nav. Co., Y. & M. V.	Baton Rouge.	xc.	P. & Ft.	1	15
25.	Mo. Pac.	Piper.	bc.	P. & P.	0	3
28.	N. Y. Cent.	Buffalo.	xc.	Ft. & Ft.	1	1

Derailments.

Date.	Road.	Place.	Cause of derlmt.	Kind of train.	No. persons reported—	
					Kil'd.	Inj'd.
5.	Del., L. & W.	Millington.	d. track.	Pass.	1	5
5.	Denver & R. G.	Aspen.	d. track.	Pass.	0	16
7.	Ches. & Ohio	Whitcomb.	unx.	Pass.	0	0
7.	Ches. & Ohio		d. track.	Pass.	1	0
12.	Erie	Binghamton.	derail.	Pass.	1	0
13.	Mo., K. & Tex.	Clinton, Mo.	washout.	Pass.	0	6
15.		Quincy, Ill.	d. track.	Ft.	1	1
16.	Balt. & Ohio	Madison, Mills.	d. track.	Pass.	1	1
17.	Louis. & Nash.	Andalusia.	unx.	Ft.	1	3
21.	L. E. & Westn.	Sandusky.	open draw.	Pass.	0	3
22.	Rock Island	Fourche, Ark.	d. track.	Pass.	0	12
23.	St. L. & S. E.	Wister, Okla.	d. track.	Pass.	0	5
25.	C. B. & Q.	Garryowen.	b. rail.	Pass.	1	1
26.	Erie	Hiram, Ohio.	unx.	Pass.	1	3
26.	C. & N. W.	Chadron.	washout.	Ft.	5	8
27.	Norfolk & Westn.	St. Paul.	unx.	Ft.	2	0
27.	Lehigh Valley	Lofly.	acc. obst.	Pass.	1	20
27.	N. Y. Cent.	Greystone.	unx.	Ft.	1	0
28.	A., T. & S. E.	Hardy.	b. bridge.	Pass.	3	20

Other Accidents.

Date.	Road.	Place.	Cause of accident.	Kind of train.	No. persons reported—	
					Kil'd.	Inj'd.
19.	Denver & R. G.	Sargent.	explosion.	Ft.	3	3
21.	Grand Trunk	Imlay City.	boiler.	Ft.	3	0
23.	Penn.	Shelton.	boiler.	Ft.	3	0
27.	C., M. & St. P.	Clinton, Minn.	tornado.	Pass.	0	17

The derailment at Millington, N. J., on the 5th, was inquired into by the New Jersey State Railroad Commission, and in a report issued on the 30th the Commission said: "At the point where the accident occurred the railroad company was engaged in replacing 67-lb. rails with 80-lb. rails, and the train in question was moving at the rate of at least 25 miles an hour, eastbound. It was derailed a few feet east of a facing point switch which had been temporarily secured by spikes. In the opinion of the superintendent and the principal assistant engineer in charge of maintenance the accident could have been explained only by the fact that said switch point was not securely and properly spiked. In this opinion the board concurs. The testimony as to the spiking of the said switch point is weak and inconclusive, inasmuch as the section foreman responsible for the section, including the

switch point, could not swear as to how many spikes had been driven at the switch point or as to whether or not the work was properly done. Another section foreman testified that he passed the point in question about one hour before the wreck and on his own motion drove an additional spike at the switch point.

"In the opinion of the board it is probable that the spiking was not properly done. The testimony shows that no 'slow order' was given to the passenger train prior to its approaching the temporarily fastened switch point. In the opinion of the board such precaution should have been taken. The testimony of the witnesses revealed the fact that as many as four section foremen were working in the vicinity of the accident, neither one of whom had complete charge of the work, and the responsibilities seem to have been divided and indefinite. In the opinion of the board there should have been some one official or employee in charge of the work and solely responsible for the safeguards which the circumstances required."

The responsibility for the collision near Baton Rouge on the 22d, at a crossing, killing a passenger, is charged to Engineman Muntz, of the L. R. R. & N. train, and the Grand Jury has indicted him for manslaughter. He should have stopped his train before passing over the crossing of the other road, but, it is said, negligently failed to do so. Muntz was injured and was laid up in the hospital two weeks or more.

The derailments at Fourche, Ark., on the 22d, and at Wister, Okla., on the 23d, are reported as due to distortion of track by unusual solar heat. That at Lofly, Pa., on the 27th is believed to have been due to a malicious obstruction, a spike having been placed on the rail. The derailment at Hardy, Ariz., on the 28th, in which one passenger was killed, and that at Hiram, Ohio, on the 26th, are also believed to have been due to malice. In this case, three cars fell through the weakened bridge, but nearly all of the injuries to passengers were slight. Of the persons killed in the derailment at Chadron, Neb., on the 26th, two were trespassers. The same is true of the explosion on the 19th.

Of the electric car accidents reported in the newspapers as occurring in the month of June, 16 were serious. One, near Annapolis, Md., already reported in the *Railroad Age Gazette*, resulted in the death of eight persons and in the injury of 12. This was a butting collision, and the confusion of orders which caused the collision is said to have been a consequence of an unusual amount of excursion business, many extra cars being run. Three persons were killed and 20 injured in a derailment at a derailing switch near Joliet, Ill. An electric car ran uncontrolled down a steep grade. It was derailed at an open derailing switch at the crossing of the Elgin, Joliet & Eastern, but the derailing switch did not accomplish its purpose, for the car, after being thrown off the track, still ran far enough to foul the track of the other road, and it was struck by a freight train of that road. Six other electric car accidents resulted fatally, namely, Kennebunk, Me., St. Louis, Mo., Niles, Ohio, Williamstown, Mass., Los Angeles, Cal., and Bakerstown, Pa. In the last mentioned case the superintendent of the road was fatally injured. A milk car was stopped and set back some distance to get some cans which had been left, and it collided with a following passenger car.

There was a serious collision in Italy, June 9, in which nine persons were killed and 65 injured. A passenger train, delayed at Roccapetra, was run into at the rear by a following freight. Near Tournay, Belgium, June 11, five persons were killed and a number injured in the derailment of a passenger train. The wreck took fire and was burned up. June 26, 20 persons were reported burned to death in the wreck caused by a collision between an express train and a freight on the Bombay, Baroda and Central India Railroad.

¹ Abbreviations and marks used in Accident List:

rc. Rear collision—bc. Butting collision—xc. other collisions
b. Broken—d. Defective—unf. Unforeseen obstruction—unx. unexplained—derail. Open derailing switch—ms. Misplaced switch
acc. obst., Accidental obstruction—malice. Malicious obstruction of track, etc.—boiler. Explosion of boiler of locomotive on road—fire. Cars burned while running—P., or Pass., passenger train—F., or Ft., freight train (includes empty engines, work trains, etc.)—Asterisk, Wreck wholly or partly destroyed by fire—Dagger, One or more passengers killed.

THE BRITISH LOCOMOTIVE.*

The student of the locomotive, in learning the lessons to be learned from the world's locomotives, will probably be struck by the apparent conservatism and backwardness of British practice. The locomotive of to-day is but an enlarged edition of that of 50 years ago. Compounding is in its infancy, while on very few lines is any attempt being made to reduce the fuel bill by the introduction of other economical systems. But it must not be thought that the attitude adopted by British engineers is a wrong one. The whole question of locomotive design is one of surroundings. Just as locality rules the general arrangements of any particular engine, so locality defines the broad principles of design. British principles are just as suitable to British surroundings as American or continental ideas are suitable to those localities, and there is absolutely no basis upon which to rest an assumption that because a certain type is successful on the Continent, it must, *ipso facto*, be successful in England.

The earliest form of British locomotive was the single driving-wheel type. With increasing loads, however, the tractive force of this type was insufficient, and the 4-coupled engine, with a fixed leading axle, was introduced. As the engines grew larger, the fixed axle was replaced by a leading bogie, which form the standard British locomotives now takes. On heavy roads the 4-coupled engine is replaced by a 6-coupled type, by which means the tractive force is again increased. Many engineers favor the Atlantic type, in which a fixed axle carries the foot-plate, all 4-coupled axles being in front of the firebox. This enables a larger firebox to be secured, but as there is no increment in weight available for adhesion, it is doubtful if this class has an advantage over the 4-coupled, 8-wheeled type. Goods engines are usually of the 6-coupled type, while for mineral traffic 8-coupled engines are employed. Tank engines are of various types, but are usually built from standard parts.

Frames are of mild steel, 1 in. or 1½ in. thick. On the London & North-Western, to avoid great lengths of frame, each is composed of two plates bolted together. The front pieces are inside the main frame, thus allowing more side play in the bogie wheels.

Frame stays, other than cylinders and draw-box castings, are of cast steel, and are riveted to the frames.

Cylinders are of close-grained cast iron, and are arranged between the frames or outside the frames. Inside cylinders are invariably cast in one. Outside cylinders are occasionally cast in one, with a saddle supporting the smokebox. There is considerable divergence of opinion as to the correct position of cylinders. Inside cylinders require a cranked driving axle. The uncertainty of crank axles has led many engineers to adopt outside cylinders. Outside cylinders have the disadvantage of requiring larger balance weights in the wheels; cause increased condensation; while the methods of securing them are unsatisfactory. They are bolted on through large flanges. As there can only be one flange available for bolting, the movement of the pistons will in time cause the bolts, originally driven in tight, to work, and the cylinder to become loose, causing breakage of steam pipes and steam-pipe joints. Thus an outside cylinder will give trouble sooner than an inside cylinder. With outside cylinders cast in one, this trouble is largely obviated, but on the whole inside cylinders are more reliable, especially in conjunction with the built-up crank axles. Cylinders are from 17 in. to 20 in. diameter, the usual stroke being 26 in.

Piston heads are of cast steel, and are provided with two cast-iron rings.

There is a decided preference for the ordinary slide valve, some method of balancing being provided. This frequently

takes the form of a rectangular frame let into grooves at the back of the valve. It is spring supported against a flat machined surface at the top of the steam chest. On the Great Northern the back of the valve is cut out, and the exhaust steam passes through direct to the blast pipe. Slide valves are usually of brass or gun metal, sometimes of cast iron.

Piston valves are not greatly favored. They have the disadvantage that the size of the cylinders does not warrant the large diameter of valve that is required if satisfaction is to be given. With piston valves under 9 in. diameter, it is a difficult matter to get sufficient spring in the rings, which leads to the valves being driven in very tight, causing excessive friction and steam consumption. On the other hand, piston valves over 9 in. diameter introduce unnecessarily large steam ports, as well as increased condensation. Where piston valves have been adopted external admission is the rule, partly on account of simplicity of valve gear, and partly because of the more direct exhaust obtainable.

The standard valve gear is the link motion or Stephenson's valve gear. On the London & North-Western and the Lancashire & Yorkshire, Joy's gear has been adopted. Walschaerts gear has been tried by a few engineers. There is no need to discuss the theoretical advantages of these radial or semi-radial gears.

In the link motion the motion of the valve is harmonic, and consequently the stresses in the rods are of a steady nature throughout the travel. In radial motions, the object of which are to obtain sharp admission and cut off, the travel of the valve is jerky, causing uneven stresses on the motion rods and pins. This results in greater wear and tear on these parts. Again, the area swept out by the links and rods in Stephenson's gear is quite minute compared to that of a radial motion. The greater the area swept out in one revolution the greater the wear on the parts concerned.

As regards the improvement in steam distribution, it is a question whether at high speeds there is any more wire drawing with a link motion than with a radial motion. The advantages of a constant lead are dubious. In a link motion with open rods the lead gradually increases as the gear is linked up, and all functions of the valve occur earlier. This leads to an earlier exhaust, a matter of great moment for high speeds.

Joy's gear has, however, one great advantage which recommends it above all others for locomotive work. It eliminates eccentrics, and hence it is possible to give an additional bearing at the center of the axle. This is provided by a center-bearing casting bolted at one end to the motion plate, and at the other to a frame stay at the back of the axle. This casting contains a brass bearing, spring floated. It is not so much a bearing in the ordinary sense of the word as a stay against the bending stresses set up in the axle. Not only does the center bearing prolong the life of the axle, but it also reduces the side wear in the axle boxes, thus making it possible to obtain a larger mileage before "knocking" sets up.

Axles are of an alloy of steel, and are rough forged under the hammer. Both nickel and chrome steel are in use on the London & North-Western.

Crank axles are made of the same steel alloys. At Crewe they are forged under the hydraulic press, both cranks in the same plane. The final operation is to twist the cranks until they are at 90 deg. to one another. A very liberal allowance is made for machining. The forging is at the best a complicated one. The effect of twisting the forging is unknown, and there is always the possibility of hidden flaws. It is on account of this, and the practically unknown stresses to which the axle is subjected, that has led many engineers to adopt outside cylinders. The other and better alternative is the built-up crank axle. This was first introduced into locomotive practice by the late F. W. Webb, whose 4-cylinder compounds were provided with these axles in 1900. So successful have they been that Mr. Whale has continued to use

*From a paper read before the Rugby Engineering Society by A. W. S. Graeme.

them in his simple passenger and goods engines. The axle is in nine pieces, each a plain forging. The crank webs are shrunk on and keyed to the journal and crankpin pieces. The webs are nearly symmetrical in shape, the journal pieces being inserted at the center. The portions of the web opposite the crank pin are of such a weight as to provide an accurate dynamic balance to the revolving masses of its connecting rod and "bog end." D. Drummond, of the London & South-Western, has also adopted built-up crank axles. Plain forged crank axles are often strengthened by hoops shrunk on the webs.

Slide Bars.—The arrangement of slide bars varies, single, double, and four bars being in use. They are usually carried by a cast-steel motion plate at one end and by the stuffing-box at the other. In some cases the motion plate only carries the bars at the center. Besides being more mechanically correct, this method has the advantage of leaving the piston glands easily accessible.

Connecting Rods.—These are steel forgings. With one or four bars, the little end is a plain brass-bushed eye, and forked, with strapped eyes secured by cotters, when two bars are used. Big ends vary in design, the ordinary strapped type being very common. These are heavy and expensive. The ordinary form of marine big end is now finding favor, as it is probably the cheapest, both in first cost and up-keep. For outside cylinders the late F. W. Webb designed a solid big end fitted with a taper block at the back of the brasses to take up wear. Mr. Churchward, of the Great Western, has introduced in his outside-cylindrical engines a plain bushed big end without means of adjustment.

Wheels are now of cast steel for passenger engines. Cast iron is sometimes used for the coupled wheels of goods engines. Tires are of a medium steel, about 3 in. thick, shrunk on. A lip is provided to engage in a recess in the wheel, to prevent side movement.

Horn plates are of cast steel, bolted to the frames. Adjustable horns are sometimes provided for driving, and coupled wheels, to minimize the boxes "knocking" in the horns. The rearmost plate does not engage with the box, but slopes away, a taper block with screw adjustment being provided between the horn plate and the box. Since most of the "knock" is developed in the box itself, by the bearing wearing oval, this seems to be an unnecessary complication, and has the objection that the taper horn is difficult to adjust properly, and there is, consequently, the danger of the box sticking in the horns.

Axle boxes for driving and trailing coupled wheels are of cast steel, with a brass bearing forced in hydraulically, and further secured by brass plugs driven in from the top of the box. The actual bearing provided is less than half the circumference of the journal. Boxes for bogie and carrying wheels are of brass, with a white-metal crown bearing about 4 in. wide. Some engineers provide movable steps or bearings to driving and coupled wheels, with the object of avoiding the lifting of the engine when dealing with a hot box. This plan has the disadvantages that the fitter is unable to get a good bearing, and also that there must be a certain amount of initial "knock."

To obtain a flexible wheel base the front end of the locomotive is carried on a truck. This is composed of two pairs of wheels carrying a separate framing. This truck is only connected to the engine by a center pin, about which the bogie can swing, the weight being carried by a flat-surfaced casting bolted to the truck frames. As the front wheels require more play than the trailing, the truck is given a certain amount of side play, generally about $\frac{3}{4}$ in. either side. This movement is spring controlled. Trucks on this principle are inclined to oscillate when running at high speeds. To overcome this the late Mr. Webb replaced the flat bearing surface by curved guides, in which the center casting carrying the

weight was free to slide, subject to the play of the controlling springs. By this means the leading wheels obtain the extra play required, while the curved guides prevent oscillation.

Springs for driving and coupled wheels are usually of the coiled type, laminated springs being provided for bogie and carrying wheels. In some cases the springs for delivery and coupled wheels are connected by equalizing levers pivoted at the center. This reduces spring wear and promotes easy riding on bad roads, but it is of little advantage where the permanent way is good.

Coupling rods are plain steel forgings, of fluted section to reduce weight. The eyes are bushed, and no means of adjustment provided.

Foot-plate Castings.—The foot-plate of a tender engine is carried on a heavy casting, in which the draw gear is situated. The weight of the casting depends largely on the weight of the cylinders, as it is required to balance the front end of the engine, so that the center of gravity of the whole is brought into the required position in the neighborhood of the driving axle. Tank engines require no foot-plate casting, as the tanks and bunker balance the cylinder casting.

It is in the design of the boiler that the greatest variation in British practice is seen. It is now universally recognized that the power and capabilities of an engine depend entirely on the boiler. This is seen in the great advance in boiler power that has taken place recently, the cylinder dimensions remaining the same. Theoretically the formula $3.3 d^2$ will give in square feet the requisite heating surface for a cylinder diameter d . Thus, for an engine with 19 in. cylinders, 1,191.3 sq. ft. would be enough. In Mr. Whale's "Precursor" class, now the standard express locomotive of the London & North-Western, 1,989 sq. ft. is supplied for this diameter of cylinder, while on a recent engine built for the North British no less than 2,500 sq. ft. is allowed to supply steam to cylinders $18\frac{1}{2}$ in. diameter. The boiler for the "Precursor" class is 5 ft. 2 in. diameter over the largest ring. There are three rings, lap riveted. This diameter of boiler enables the copper box to be much wider at the top than at the bottom. In ordinary boilers of this size this fact necessitates the firebox covering plate being in three parts, so that the copper box can be inserted from the top. In this particular boiler, however, the steel covering plate is in one, the copper box and foundation ring being inserted from the back before the back plate is riveted in position. To enable this to be done the back plate is flanged externally, the rivet heads being thus on the outside and easily accessible for hydraulic riveting. There is no fire-hole ring, the copper being flanged outward to suit a similar flange in the steel plate. All rivet and stay holes are drilled. The water spaces are 3 in. wide on the foundation ring. The copper box is stayed with copper stays, 1 in. and $1\frac{1}{4}$ in. diameter. The roof is stayed from roofing bars slung from the covering plate. The top of the back plate is stayed by gussets. There are no longitudinal stays between tube plates. The tubes are of copper, $1\frac{1}{4}$ in. diameter. All steel plates are $\frac{5}{8}$ in. thick, except the $\frac{3}{4}$ -in. smokebox tube plate; all copper plates $\frac{7}{16}$ in., except the tube plate, which is 1 in. Steam is taken from a dome, where the regulator is situated.

The firebox is generally the most troublesome part of the locomotive boiler. Roofing bars are heavy, and prevent the top of the box from being cleaned properly. Hence the introduction of the direct roofing stay. With the ordinary curved covering plate direct staying is difficult, although D. Drummond has had great success with his method. The best method of direct staying is found in the Belpaire firebox, in which the covering plate is flat topped. The Great Western standard boiler is the best example of the Belpaire type. The barrel is tapered, all the taper being above the center line. The Belpaire box is of the flush-topped type, while the sides of the covering plate also taper outward from the back. This

method of tapering gives a great increase in the water and steam spaces about the box.

Belpaire boxes have either raised or flush tops. That is to say, the covering plate is either a few inches above the top of the last barrel ring, or on the same line with it. The flush-topped type is more expensive, as the covering plate flange on the front or throat plate has to be made by hand. The reason for this is that after the barrel flange has been made the flanging machine cannot make the covering plate flange satisfactorily, as the dies have no grip on the top of the throat plate. These conditions do not obtain on the raised-top type, and so the throat plate can be flanged by machine.

Mr. Ivatt, of the Great Northern, does not bring the firebox down between the frames, but carries them over on either side, thus securing a very wide box without restricting the water spaces. The tubes are $2\frac{1}{4}$ in. diameter. Although there is a loss of heating surface by adopting tubes of this size, it no doubt results in less wear and reduction of weight in the tube.

To increase the most efficient portion of the boiler heating surface, Mr. Drummond has introduced inclined water tubes, which cross the firebox from water space to water space. There are covers opposite the tube ends, studded to the covering plate, whereby inspection and renewal are simply secured.

The introduction of large-diametered boilers means a big increase in the height of the center of gravity of the whole engine, but given ordinary precautions this is preferable, as it entails less wear and tear on the permanent ways and wheels.

Boilers are usually fed by injectors, which are generally of the automatic restarting type. In some cases exhaust steam injectors are used. On two lines pumps are provided with economical results. Gage glasses are usually fitted in duplicate, and are protected. They are, of course, provided with taps to enable a broken glass to be replaced. On the London & North-Western internal ball taps are provided, where the flow of steam and water is automatically stopped on a glass breaking.

Very little attention is paid to the design of smokeboxes, probably on account of the very slight knowledge obtainable of the action of the blast. In most designs there is a quantity of waste spaces in the box, in which the blast has to form a vacuum. Eddy currents are probably set up, causing efficiency to be lost. The most efficient smokebox would seem to be one embracing the tube area only, and changing by gradual curves into the plane of the exhaust. The blast pipe is as a rule high, the exhaust nozzle standing between the center line of the boiler and the top row of tubes. Low blast pipes are now finding favor, and should, theoretically, be more efficient. To promote freedom in the formation of the vacuum, smokeboxes should be as free as possible from steam and other pipes.

Balancing is a very important factor in the speed, riding, and wear and tear of a locomotive. Balancing is largely a matter of compromise. The forces to be balanced are:

(1) Revolving masses. Weight of unbalanced parts of crank-webs + weight of crank pin + weight of large half of connecting rod.

(2) Half the reciprocating masses. Half (weight of piston and rod + weight of cross-head + weight of small half of connecting rod).

These disturbing forces require to be balanced in the wheels, the weights being inversely proportional to the distances of the center line of cylinder from each wheel. Thus, for a left-hand cylinder, the balance weight for the reciprocating masses is divided between the wheels so that the moments of each portion about the center line of cylinder are equal. These are placed opposite the left-hand crank. Similarly with the weights balancing the revolving masses. The balance weights for the right-hand engine are similarly obtained, and placed

opposite the right crank. Thus there are two balance weights in each wheel, both opposite a crank. This is inconvenient, and the position and mass of a combined balance weight is obtained by the parallelogram of forces. A reduction in this weight is made, equal to half the coupling rod, which is opposite the crank. The other half of the coupling rod is balanced in the coupled wheel. For outside cylinders it is customary to balance the entire disturbing forces in the adjacent wheel. Balancing is simplified and greatly improved by the adoption of the built-up crank axle, in which the revolving masses are entirely balanced by the extended crank webs. This leaves only the reciprocating masses to be balanced in the wheel, and so reduces the weights in the wheel and the consequent hammer blow on the rails.

It has hitherto been insisted that the keynote of the British locomotive is simplicity. At the same time, engineers are ever on the search for ideas, which, while fulfilling all the conditions imposed by simplicity, yet make for the efficiency and economy of the machine. There are three systems now being experimented upon, to a greater or lesser extent, in England.

Superheating is being tried on one or two lines. In each case the waste heat in the smokebox is used to superheat the steam on its way to the cylinders. It entails a great number of steampipe joints and unions, besides filling up the box with piping, in which the wastage must be considerable. These practically condemn superheating upon the points of first cost and up-keep.

Throughout the history of the London, Brighton & South Coast, with the exception of the last 10 years, feed-water heating has been the standard practice, to which, with certain modifications, the present locomotive engineer has returned. Part of the exhaust steam is trapped and turned into the tender, a pump being provided in place of an injector for boiler feeding. Mr. Drummond is also experimenting successfully with this system. He, however, passes his exhaust steam into a tubular condenser under the tender, round the tubes of which the feed water circulates. The substitution of a steam pump should not entail any additional expense, either in first cost or up-keep, and would probably be more reliable than an injector when dealing with bad qualities of water. This system should be the cheapest and most efficient way of securing economy in fuel, as well as reducing the cost of boiler up-keep.

Without going deeply into the subject of compounding, the author will endeavor to give a brief summary of the subject from the British point of view. In the first place, the locomotive works under completely different conditions to all other classes of steam engine in which compounding has been so successfully introduced. Compare the locomotive with the marine engine. In the latter the speed is constant; in the former it is changing every moment. In the marine engine the load gradually increases until the full power of the engines is being developed, when it remains practically constant. In the locomotive the greatest tractive effort is at the start and gradually decreases as the horse-power increases, while the actual load is constantly varying. There are, therefore, no factors from which the cylinder ratio can be determined, with the result that cylinder dimensions are obtained arbitrarily, with a view to suitability to the general arrangements of the machine. Again, much of the economy of the marine engine is derived from the use of the condenser, which is almost out of the question on a locomotive. Thus none of the axioms of compounding are available for application to the locomotive, and the question must necessarily be settled by actual performance, and not by theoretical considerations. Before proceeding further, a short description of the types of compound locomotives that have been tried in England will be interesting.

Two-cylinder engines on the Worsdell-Von Borries system

were introduced on the North Eastern. These were found to be uncertain in starting, while the balancing was peculiar, owing to the unequal weights of the high and low pressure motion. This caused bad riding, while the increased hammer-blow of the low-pressure balance weights caused excessive tire wear on that side.

Three-cylinder compounds, on the late F. W. Webb's system (two high pressure and one low pressure) performed excellent work in their day, but the small size of the high-pressure cylinders made them uncertain in starting. They were engines requiring very clever handling, which could only be obtained with experience. They eventually got a bad name from being badly handled and from being overloaded.

Three-cylinder compounds on Smith's system have one high-pressure and two low-pressure cylinders. They are assisted in starting by high-pressure steam being passed into the low-pressure cylinders through a reducing valve. The balancing is very fair. Four-cylinder compounds are most favorably considered. The first introduced was that by the late F. W. Webb, in which two sets of Joy's gear drove the four valves. These engines are probably the best-balanced engines running, as the reciprocating masses balance each other, while the low-pressure revolving masses are balanced in the built-up crank webs, leaving only the high-pressure revolving masses to be balanced in the wheel. They were, however, inclined to be sluggish in running. Reverting for a moment to the difference between a locomotive and a marine engine, it should be noted that the methods of driving are different. The engine driver links up his engine to obtain speed; the marine engineer to reduce it. In other words, the marine engine is most economical at full power. Turning again to the Webb four-cylinder compound, linking up the two sets of gear resulted in excessive compression in the high-pressure cylinders, and consequently the engine lacked speed. Mr. Whale has recently added a separate Joy's motion to the high-pressure cylinders, and it is now possible to link up the high-pressure gear, while leaving the low-pressure in full gear, with the result that the excessive compression is done away with. The engine is correspondingly freer in running. Most four-cylinder compounds are built on similar lines, and usually have four sets of valve gear. The question of linking up is the first argument against the compound system. If a compound was always worked in full gear there can be no doubt that it would effect a very considerable saving in fuel over a simple engine worked in full gear. But a locomotive must be linked up to obtain the necessary speed. This causes the greater part of the expansion to take place in the high-pressure cylinders, leaving but little to be taken out in the low-pressure.

It is argued that in the simple engine it is possible to expand the steam to as great a practical extent in the one cylinder, and that the exhaust is not worth detaining to be expanded in a low-pressure cylinder. In other words, with equal boiler pressures and early cut-offs, the simple engine will be just as economical as the compound. But while working at late cut-offs, the compound will show an economy over the simple. Here lies a point in favor of compounding for mineral locomotives. This class of engine, when hauling the 700-ton loads that are nowadays so common, is generally worked at full power, with very late cut-offs. Neither is the full tractive effort required at the start, as with loose-coupled trains the wagons are picked up one by one. Thus a compound mineral engine should show considerable saving over the simple. If the compound passenger engine shows any economy, it is solely on account of the higher boiler pressures employed. Thus the superficial question is answered in favor of the compound. But the real question is, at what cost is this saving in fuel attained? It is seen that the economy in a passenger engine is due to the higher boiler pressures employed. It is generally agreed that with pressures over 175 lbs. per square inch, boiler troubles increase out of all pro-

portion to the increase in pressure. Thus it is probable that, with coal at the present price, the actual saving of a compound passenger engine is entirely swallowed up in the extra boiler repairs required. But leaving this on one side, there is the additional first cost of the extra pair of cylinders, rods, and motion. These have to be kept up at considerable expense.

It is argued that the four rods and motion of a compound only do the same amount of work as the two of the simple engine. This is true, but the wear and tear of rods and motion is nearly as much due to idle running as to the stresses to which they are subjected. A four-cylinder compound must necessarily have two cylinders outside the frames. This introduces the steam pipe difficulty. There are in this type of compound at least nine steam pipe joints, as against five in a simple engine. And, again, there are double the number of glands to keep in order. The cost of their up-keep is probably greater in proportion, as there is always a great deal of condensation going on in the low-pressure cylinders, which results in greater wear in the glands. The oil consumption is, of course, correspondingly greater in a compound.

Bearing in mind that compounding has to pay for additional first cost, more frequent boiler repairs, increased cost of up-keep of engine and motion, and greater oil consumption, it is impossible for the compound system to pay its way in England while coal is at its present price. And herein lies the very bottom of the whole question. While coal can be obtained at its present comparatively low rate the compound has no chance in England. But there is a price at which compounding will pay, and when coal reaches that figure then the compound will become the standard British locomotive.

THE HAY TRAFFIC IN NEW YORK CITY FREIGHT YARDS.

The decision of the Interstate Commerce Commission concerning demurrage rates on carloads of hay, reported in our news section this week, gives interesting details of the conduct of this business at New York, some of which we reprint herewith.

The members of the New York Hay Exchange Association, which attacks the lawfulness of these charges in this proceeding, are commission dealers in hay and straw in Greater New York and vicinity. They receive consignments of hay from the country, dispose of the same when received, and charge for their services \$1 per ton. The commission man pays in the first instance the freight, but charges this against the proceeds from the sale of the hay upon final settlement. About 75 per cent. of all the hay and straw consumed in the city of New York is handled in this manner.

The car-service rules applicable to this territory provide for a free period of 48 hours beginning at 7 o'clock a.m. on the day next following that upon which the car is placed for unloading, and a demurrage charge of \$1 per day for each 24 hours or fraction thereof following, not including Sundays and holidays. The various defendants maintain one or more yards upon the island of Manhattan and sometimes in Brooklyn, at which they make track delivery of various kinds of carload freight, including hay. When hay is shipped to New York it may be consigned directly to one of these yards, in which event it is taken to this yard without further direction and there placed for unloading. In this case the notice, which is sent by mail, would be deposited in the post office the day on which the car is placed, and the free time would begin to run from 7 o'clock of the following morning. The commission merchant would ordinarily receive his notice upon reaching his office the next morning, and would therefore have the entire 48 hours in which to dispose of the hay and unload the car.

It generally happens, however, that when the carload of hay

is shipped from the country the commission merchant does not know at what terminal he desires to receive a delivery, and for this reason causes it to be shipped under arrangement that he shall be notified of its arrival upon the New Jersey side and given opportunity to direct its delivery at such New York or Brooklyn terminal as he may wish. In this case his free time begins to run upon the Jersey side. If, for example, the carload arrives at Jersey City on Monday, the railroad company will notify the consignee of its arrival by notice deposited in the post office Monday, and the free time will begin to run at 7 o'clock Tuesday morning. The commission merchant would receive the notice upon reaching his office Tuesday morning; and since he now knows at what terminal he expects to sell the hay, he can at once notify the railroad company of the delivery which he desires. While it sometimes happens that the commission merchant, for various reasons, may allow the hay to remain on the Jersey side for several days, in the great majority of instances he at once gives the railroad company forwarding instructions. The defendants decline to accept a notification by telephone, requiring that written notice shall be given upon a blank provided for that purpose, and in practice the shipper fills out this blank and mails it to the railroad.

The free time which had begun to run at 7 o'clock in the morning, continues to run until the railroad company receives this notification from the consignee, and thereupon stops running. If the railroad company should receive this forwarding notice at 4 o'clock in the afternoon, the free time would then stop running, and nine hours of the entire 48 would have been consumed; but if the notice should not be received until 8 o'clock the next morning, which appears to be the more usual course of business, 25 hours of the 48 would have passed. The running of the free time is now suspended until the railroad company places the car at the designated terminal for unloading. The time occupied in this transfer from Jersey City to New York or Brooklyn seems to vary greatly, being sometimes a single day, but often 10 or 15 days. The running of the free time is resumed when the car is placed for unloading at the terminal and notice sent the consignee, beginning to run apparently at 7 o'clock a.m. of the day after the car is placed and the notice sent. This second notice specifies the exact hour at which the free time will expire and demurrage begin. Since the fraction of a day counts as an entire day in assessing demurrage charges, if the car is not unloaded when the free time expires a day's demurrage accrues.

The members of the complainant association generally stated that, as a rule, their free time was practically used up in getting cars from the Jersey side to the unloading point, and that it seldom happened that there remained a full day after the receipt of the second notice.

When the car is placed for unloading the commission merchant sets about selling the hay. All sales seem to be made upon personal inspection by the buyer. Large quantities of hay are shipped into New York over the lines of the New York Central, and these are usually delivered at the Thirty-third street yards of that company, where a hay house has been provided by the railroad into which carloads of hay can be unloaded and stored. These yards have become the hay market of New York, and buyers in search of hay go there. With respect, therefore, to hay delivered at this point the buyer seeks the commission man, but with respect to other terminals it seems necessary for the commission man to seek the buyer. He generally has in mind some one or more persons who will be likely to take the carload of hay which he has ordered to a particular terminal, and whom he now asks to visit the yard and inspect the hay with a view to purchasing.

It often happens that the commission merchant is unable to secure the attendance of the buyer the first day. The testimony shows that about 10 per cent. of the carloads of hay placed at other terminals than the Thirty-third street yards

of the New York Central are sold on the first day after they are placed, about 75 per cent. on the second day, and the balance at varying periods, depending upon conditions.

The sale is invariably made with the understanding that the commission man is to give the purchaser the balance of that day and the following day in which to unload the hay. If, therefore, demurrage accrues within that period, it is paid by the commission merchant.

It is evident that where the free time does not begin to run until the car is placed at the terminal for sale, and where, therefore, the commission merchant has the entire 48 hours in which to sell and discharge the contents of the car. Here, even, he cannot usually do this within the free time except at the New York Central Thirty-third street yards. If he has already used up half or more of his free time in ordering the hay forward to the terminal, his situation is that much worse. Statements furnished both by the shippers and by the railroads indicate that, on the average, demurrage has been paid in the past upon carloads of hay disposed of by commission men to the amount of from \$1 to \$2 per car. Unless the method of handling hay can be in some way changed the car cannot be discharged within the free time nor within less than from 24 to 48 hours in addition to the free time. This is not due to any remissness upon the part of the members of the complainant association or those engaged in like business; it results from the very manner in which that business is conducted.

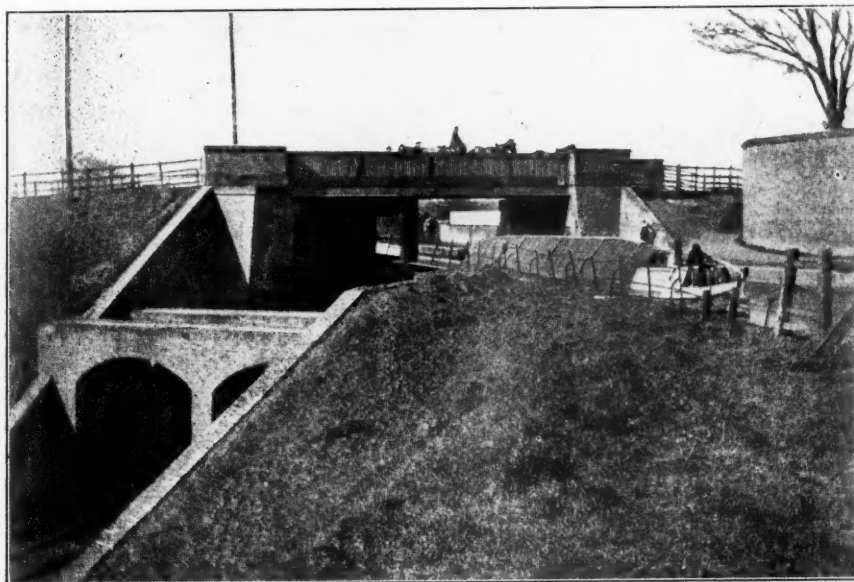
As already stated, the New York Central has erected at its Thirty-third street yards an extensive hay storehouse, containing about 150 carloads. A small unloading charge, about equivalent to the actual cost of the service, is made, and in addition there is a storage charge equivalent to the demurrage which would be imposed had the hay remained in the car. So far as this case shows, no other railroad company provides a hay house of any considerable size, and the contention of the complainant is that the various defendants ought to construct and operate hay houses in the same manner as does the New York Central; while the defendants, upon their part, insisted that the commission man should not be allowed to use the cars of the railroads as storehouses, which was virtually the result of the present method of conducting the business, but should build warehouses of their own.

* * * At the present time carriers pay one another a per diem of 25 cents for the use of a freight car. This is not conclusive upon the shipper; but on the whole that sum may be taken as fairly representing the value of such use and may properly be charged against the shipper who retains the car beyond the period for which he is entitled to it. In addition to that, the railroad may impose a charge for the use of its tracks. The cost of this latter service varies greatly with the locality at which, and the circumstances under which, it is performed. The cost of providing yard room in the city of New York is extremely high, and the actual expense to the carrier of storing upon its tracks a car upon the Island of Manhattan is many times what it would be in a country village. Take, for example, the Pennsylvania yard at Thirty-seventh street, which has a capacity of 165 cars. If this yard were full every day in the year, at the rate of \$1 per day, not including holidays and Sundays, the income from demurrage would be less than \$50,000. Assume now that the maintenance and the operation of that yard should be entirely charged against the delivery of the freight, and that therefore nothing of this expense should be reckoned against the mere storage of the car, still it is evident that the entire income at \$1 per day would not equal the interest at 5 per cent. upon \$1,000,000. The testimony indicates, and it is almost a matter of common knowledge, that the land upon which this yard is constructed could not be purchased for \$1,000,000. It is reasonably evident that \$1 per day in the city of New York does not cover the actual cost to the railroad of the storage service.

ROAD, CANAL AND RAIL; JOINT CROSSING.

BY W. B. PALEY.

Among the many old railroad works of much interest in the London district may be reckoned Windmill Lane bridge, in the parish of Hanwell, Middlesex. This presents one of the rare cases where a highroad, a canal and a railroad cross each other at the same point. They are in the order named, counting from the top. The road runs from near Brentford and Isleworth to Harrow. The waterway is the Grand Junction canal, connecting the midlands with the river Thames and opened upward of a century ago, while the railroad is a branch of the Great Western from Southall to Brentford. The roadway is about 42 ft. long by 26 wide, carried upon



Joint Crossing; Railroad, Highway and Canal.

six cast-iron girders, braced together with tie-rods. A heavy wooden beam is laid upon each of the face girders and carries the corrugated iron parapet. A large cross-girder of I section goes diagonally under the road girders, which rest upon it, and is built into the abutment at one corner, while at the other it rests upon an iron support of the same section. This support stands on a dwarf wall of brick, built between the two lines of railroad, and which also carries the trough, of cast-iron segments, containing the canal. The latter is flat-bottomed, to give as much headway as possible for the engines, while the boats used are as nearly flat-bottomed as possible. The waterway is about 20 wide under the bridge and narrowing specially for it, and perhaps 4 ft deep. A cast-iron strut is placed on each side from the pillar carrying the cross under-girder of the road, horizontally, into the wing wall, at a right angle to the canal trough, thus resisting any possible tendency for it to move sideways. The side plates of the canal are in two rows, the lower ones being three each, 20 ft. long, the upper ones shorter. The flanges are, of course, outside. Tie-rods pass across the bottom to stiffen the structure, which is lined with cement inside. On the west side, over the railroad and under the bridge, the tow-path has a parapet formed of three cast-iron plates 20 ft. long and about 4 ft. high. Under the road they are built into the wall, flush with it. The outer corner is worn into deep grooves by the friction of the tow-ropes. Although half a century old, the railroad having been opened in 1859, the work is in excellent order and as tight as a bottle. The roadway, however, is hardly adequate for the growing traffic; in fact, notices at each end, 35 years old, warn users of traction engines from going over.

The rail level is about 30 ft. below the bottom of the road bridge and about 15 below the canal. The line was originally

built for the broad, or 7 ft. $\frac{3}{4}$ in. gage, the engines for which had somewhat taller funnels than the present ones, but for many years it was of "mixed gage," an additional rail between the others being used by the "narrow gage" (4 ft. $8\frac{1}{2}$ in.) trains. On the east side of the crossing two heavy cross-arches of brick, close together, are built in the cutting to support the ground carrying the canal. Any movement of the ground here would, of course, be most serious, as the bursting of the canal would flood the railway and stop the traffic upon both. The arches just named are double; that is, there is one for each line of rail in both of them. They are also connected longitudinally in the center, the whole forming a very solid strut.

The spot in question is just 90 miles from the northern terminus of the canal at Braunston, in Northamptonshire, and about three from the Thames at Brentford dock by either rail or canal. The work was one of the last designed by the younger Brunel, as engineer to the Great Western Railway. In fact, he died just after it was finished.

It should be added that the road forms a right angle with the canal, but the latter and the railroad make an X cross.

A similar road canal railroad crossing, and in the same order as at Hanwell, existed for many years alongside the Great Western Railway, $2\frac{3}{4}$ miles from Paddington. The railroad passing at the bottom had, however, been closed and done away with ever since 1859, when it was diverted to go over the canal, instead of under, to avoid crossing the Great Western on the level. The arch remained until a few months ago, and was rather a striking object, being shut up at the far end and quite dark. Here again the canal passed in a cast-iron trough, but the

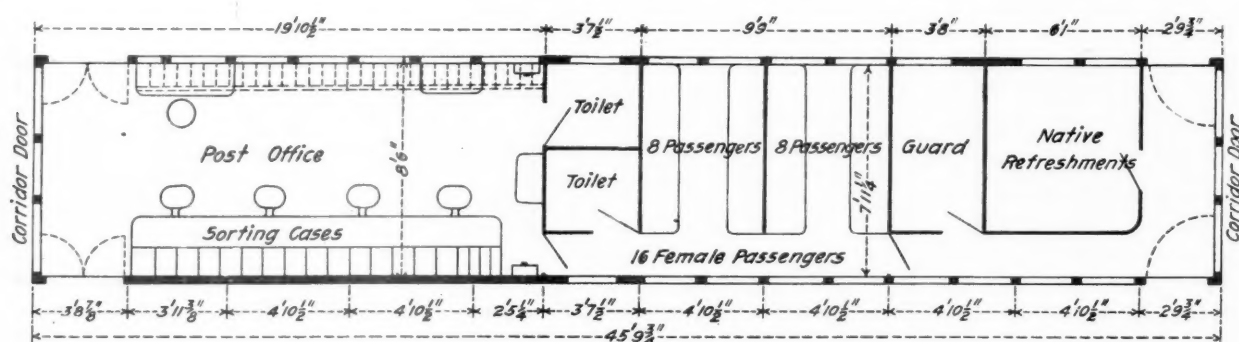
subway has now been bricked up and additional lines of rail, for the widening of the line, laid close up to it.

CORRIDOR TRAIN FOR SOUTH INDIAN RAILWAY.

The South Indian Railway (meter gage) has in service between Madras and Tuticorin a corridor train differing somewhat from previous practice of the road and interesting as showing the requirements of Indian service. The train consists of 10 cars, as follows: One composite postal van, five third class carriages, one composite dining car, one second class carriage, one first class carriage and one luggage van. As compared with American rolling stock, the cars are short; they are only 45 ft. long, with the exception of the dining car, which is 47 ft. 6 in. In this train traditional designs for meter gage passenger cars have been entirely discarded.

The salient points in the new design are: the comparatively great length and width of the body, the latter having been increased to 8 ft. 6 in.; the absence of sunshades; the corridor or aisle extending the length of the car; the vestibule connections by which communication from end to end of the train is made possible; the coupe character of the upper class carriages, and the facilities for providing food and drink to the upper and third class passengers while the train is in motion; the luxurious accommodation provided for the first and second class passengers, and the comfortable and liberal accommodation provided for the third class passengers, which are said to be equalled on no other line in the country.

The train is lighted throughout by electricity, on Stone's system. By the absence of side doors, the passengers, when once seated, are ensured against disturbance during the jour-



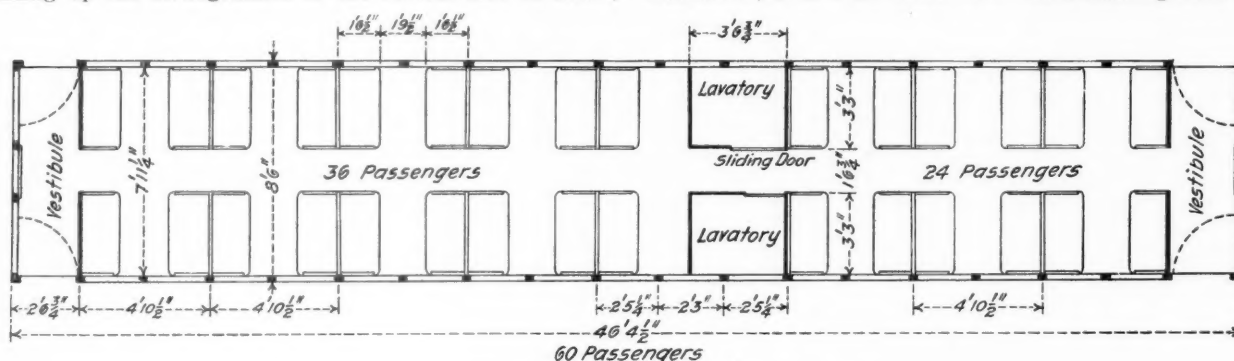
Postal Van; Indian State Railroads.

ney. An interesting side-light is thrown on the character of the natives, or possibly on the prevailing conditions, by a note from an official of the road, which, in commending the corridor construction, calls attention to the additional security that the public will derive from its use by the protection afforded against thefts, "as the police being able to move freely throughout the train will soon locate the thief." Finally, one of the advantages claimed is the impossibility of overcrowding and the commodious latrine arrangements throughout.

Taking up the arrangements of the several cars in detail,

of Winter's electrical intercommunication. The refreshment compartment provides refreshments and necessities for native passengers. This comfort is entirely new and it is anticipated that the innovation will be much prized by the native traveling public. From this compartment refreshments, aerated waters, etc., can be distributed by attendants throughout the train, or the passenger can, if he so desires, visit the compartment himself.

In the third class carriage, the dimensions are: 46 ft. 10 1/2 in. over body, 48 ft. 10 3/4 in. over vestibules, 45 ft. over headstocks, 8 ft. 6 in. width over waist molding with a turn



Third Class Carriage; Indian State Railroads.

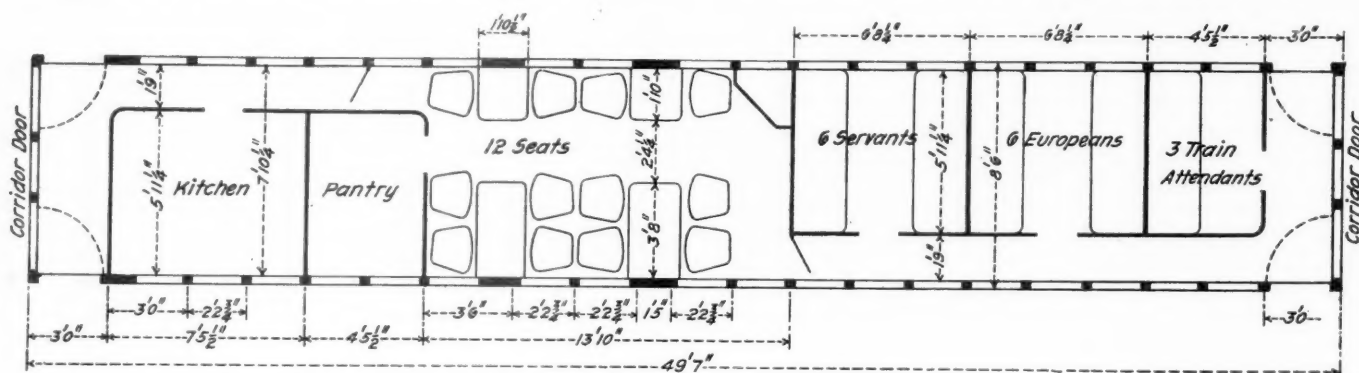
the important dimensions of the composite postal van are as follows:

Length over body.....	45 ft. 9 3/4 in.
" vestibules.....	48 " 10 3/4 "
Width over waist molding with turn under	
4 1/2 in. on each side.....	8 " 6 "
Width over foot steps.....	8 " 2 "
Width over sole bar brackets.....	7 " 3 3/4 "

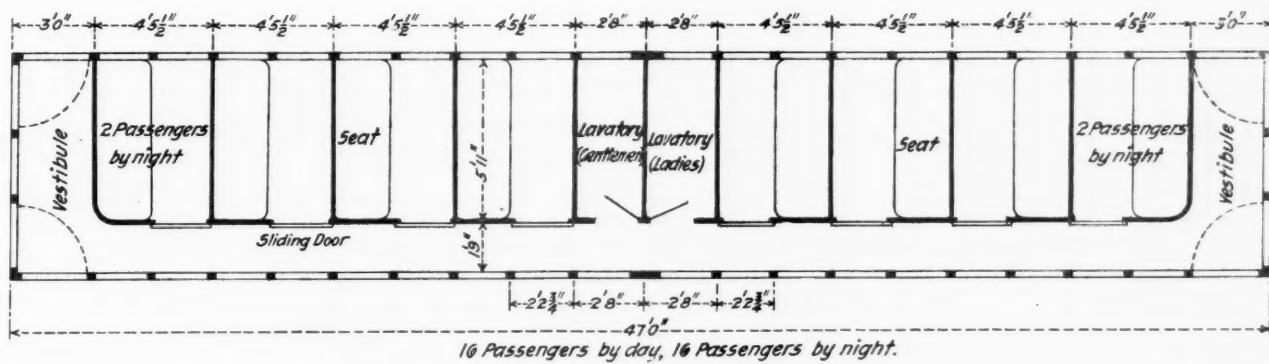
This car is divided into four compartments. The postal compartment is large and the increased width will undoubtedly add to the comfort of the postal employees, and to the efficiency of their work. It is liberally illuminated with electric lights. The compartment for women accommodates 16 persons. The second guard's compartment fitted with hand-brake and all other necessities. This guard is also in direct communication with the engine and the chief guard by means

under of 4 1/2 in. on each side, 8 ft. 2 in. width over foot steps, 7 ft. 3 3/4 in. width over sole bar brackets. The seating capacity of this carriage is 60 passengers. Two lavatories are also provided in the center of the carriage so as to be as conveniently accessible to the passengers as possible. The lavatories are fitted with liberal flushing arrangements. The seats are arranged transversely and are of comfortable design; each seat accommodates two passengers, a passage between the seats runs down the center of the whole carriage, rendering accessibility to its different parts easy and comfortable. Liberal racks for passengers' small luggage are provided and the carriage throughout is lighted by electricity.

The dimensions of the composite dining car are: 49 ft. 7 in. over body, 51 ft. 4 3/4 in. over vestibules, 47 ft. 6 in.



Dining Car; Indian State Railroads.

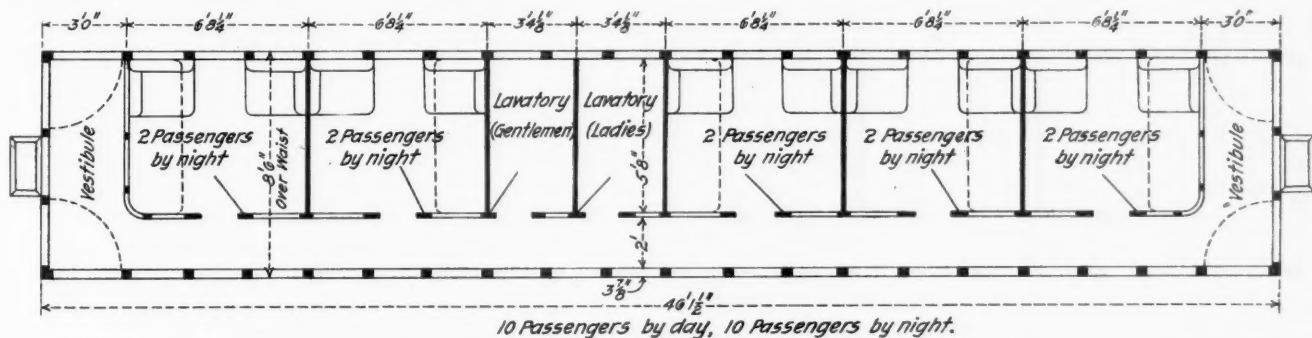


Second Class Carriage; Indian State Railroads.

over headstocks, 8 ft. 6 in. width over waist molding with a turn under of $4\frac{1}{2}$ in. on each side, 8 ft. 2 in. width over foot steps, 7 ft. $3\frac{3}{4}$ in. width over sole bar brackets. The dining saloon accommodates 12 passengers; this may seem small, but the car is only intended to run during summer months, and it is considered that the accommodation provided will meet requirements during that time. For the winter season dining cars of much greater capacity are to be built, and will run during the cold weather months. The compartment is paneled in teak with moldings and framings to suit. The ceiling is of "Alhambrine." The compartment is com-

ments and two bath-rooms are entered. The capacity of each compartment is two only, an arrangement which will increase the privacy and comfort of traveling. The seats are arranged transversely and the compartment is well fitted with electric fans, lights, wash basins, looking glass, etc. Each compartment, as well as the lavatories, are fitted with bell pushes by which the train attendants can be immediately summoned if required.

The first class carriage dimensions are: 46 ft. $1\frac{1}{2}$ in. over body, 48 ft. $10\frac{3}{8}$ in. over vestibules, 45 ft. over headstocks, 8 ft. 6 in. width over waist moldings with a turn under of

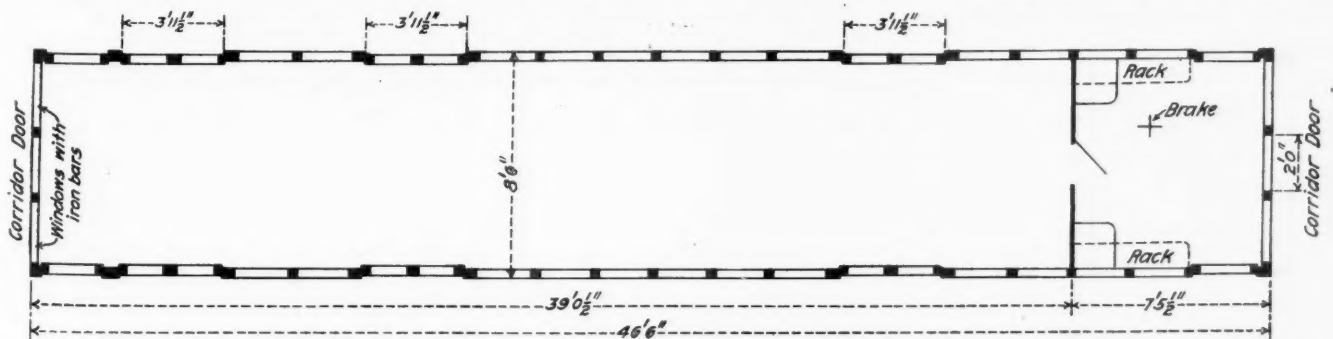


First Class Carriage; Indian State Railroads.

fortably furnished throughout and is liberally supplied with electric fans and lights. The kitchen and pantry are well arranged and fitted with stove, sinks, cupboards, refrigerators, bottle racks, etc. Next to the dining compartment comes a comfortable compartment for passengers' servants, then a compartment for third class European and Eurasian passengers and the end compartment is reserved for the train attendants.

The second class carriage measures 47 ft. over body, 48 ft. $10\frac{3}{8}$ in. over vestibules, 45 ft. over headstocks, 8 ft. 6 in. width over waist molding with a turn under of $4\frac{1}{2}$ in. on each side, 8 ft. 2 in. width over foot steps, 7 ft. $3\frac{3}{4}$ in. over sole bar brackets. This carriage is one of the most comfortable yet designed for the second class passengers. A side corridor runs the full length, and from it eight compart-

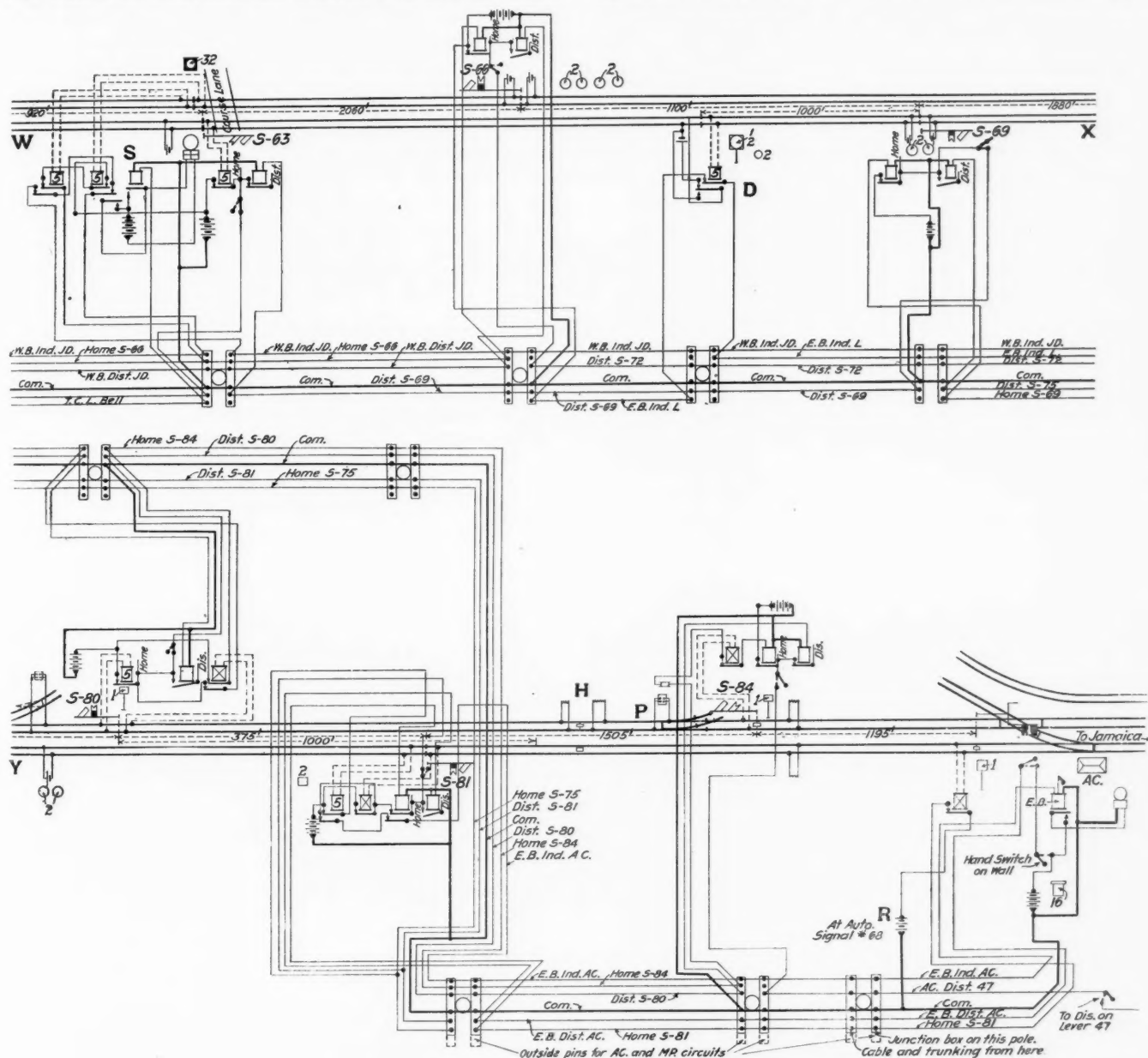
$4\frac{1}{2}$ in. on each side, 8 ft. 2 in. over foot steps, 7 ft. $3\frac{3}{4}$ in. width over sole bar brackets. The design is similar to that of the second, but the compartments are not so numerous and consequently are more commodious. There are five compartments. Two lavatories, one for women and one for men, are situated in the center of the carriage; these lavatories are well equipped with the newest sanitary conveniences known, including a shower bath in each. The accommodation in each compartment is for two only, one berth running longitudinally the length of the compartment, the second running transversely at waist level the width of the compartment. The latter is a folding one, and during the daytime can be folded up against the side. The longitudinal couch during the day time is convertible into two seats. This arrangement affords comfortable seating accommodation for two and



Luggage Van; Indian State Railroads.

mission lines are quite near. West of signal S 81 alternating current could not be used owing to the prohibitive cost of running the necessary transformer feeds. Therefore the circuit between the trolley crossing and signal S 81 was fed from the middle by four cells of gravity battery as shown. Each of the other circuits liable to interference from foreign current contains two track batteries and two relays. Local conditions made this necessary in any case. All the wiring between F and G is in trunking on stakes except where it passes under the street. Here a cable was run in 2½-in. bituminized conduit made in overlapping sections, each joint being cemented with Chatterton Compound and wrapped with two layers each

over L are pipe connected. It was thought advisable to break the control circuit of signal S 84 through the switch box on switch P, owing to the unreliability of a shunt on an a.c. track circuit. Eastbound trains are announced to A C by an indicator and bell from the trolley crossing and likewise to J D from signal S 72. Distant signal levers were dispensed with at both plants. The semi-automatic distant signals are controlled through circuit breakers on the home signals and hand switches on the walls of the tower. The battery shown at R was already in place for the operation of an Atlantic Division signal not shown on the plan. Westward from J D signals are controlled by the Union controlled manual appar-



Automatic Block Signals on Long Island Railroad.

The cuts on the two pages are parts of a single diagram, the connections being indicated by the letters W, X and Y.

of Okonite and Manson tape and painted with "P. & B." paint. The whole is inclosed in boxing made of 1-in.x8-in. lumber.

Signals S 76 and S 75 are controlled, together with the derails on the trolley tracks, by a four-lever Stevens interlocking machine, operated by the crossing watchman. The electric lock M operates on the derail lever to lock it normal when a train passes H westbound or D eastbound and holds until the train has cleared the trolley crossing. Bells N and O, together with the two indicators, announce trains from these two points. Switch and derail K and the siding cross

atus. Relay B is a stick relay in series with the slots on signals 15 and 13 and the stick circuit is controlled by a circuit breaker on lever 12. This arrangement is introduced to force the signal man to restore signal 12 to the stop position after the passage of a train so as to insure that the electric lock on its lever, which is not shown on the plan, will act. The lock is controlled by the block instrument, also not shown. The arrangement is such that after the passage of a train past either 15 or 13 with 12 reversed, relay 5 will open and break its own circuit. Thereby it keeps the slots de-energized until

lever 12 is put normal. Electric lock A, controlled by a circuit breaker on signal S 63, operates on distant signal lever No. 1 to lock it normal when the lock is de-energized; so that the signal man cannot reverse lever No. 1 when S 63 is at danger. Thus advance signal S 63 controls signal No. 1 just as though it were interlocked with it. Signal No. 1 is wire connected. The function of the circuit breaker C on lever No. 7 is to energize the 250-ohm bell control relay S at Course Lane. This is to provide for ringing the bell when the eastbound home track relays are open in consequence of switch No. 7 being set for the Rockaway Beach Division.

All wires shown as dead ending at J D have to do with the controlled manual. All signals are style B Union and all relays glass enclosed Union. All relay boxes are iron on iron posts. All case batteries are Waterbury potash as furnished by the Bryant Zinc Co. Wherever there are more than two relays at one signal location only the two intimately connected with the operation of the signal are put in the signal case, except at S 72 and S 63, where all the relays are in the signal case, as the batteries are in wells. For instance, at S 75 the two 250-ohm relays are in the mechanism case and the 5-ohm track relay is in the relay box.

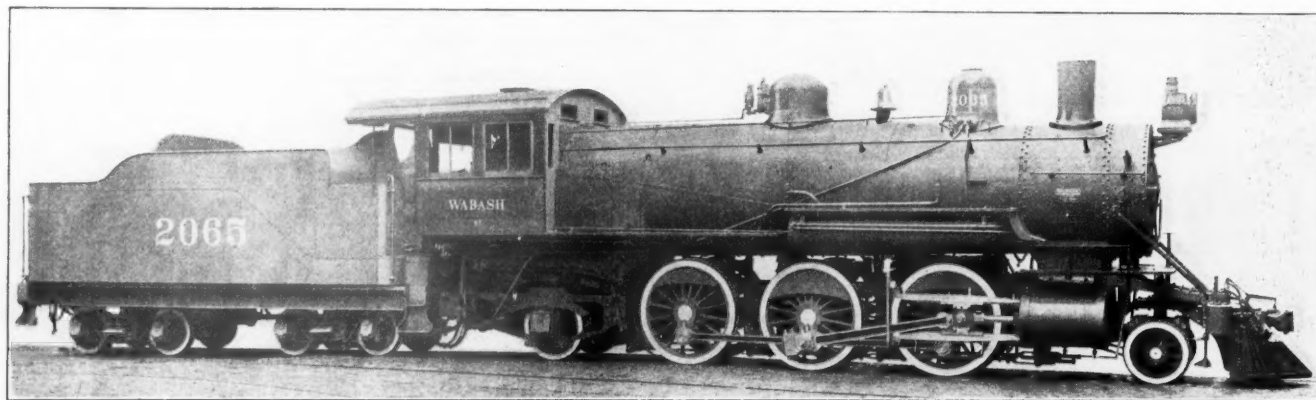
Signal S 76 is set on a concrete arch built over the ditch, the upper surface of the concrete being made large enough to serve as a platform on which the repairman may stand.

PRAIRIE LOCOMOTIVE FOR THE WABASH.

A few months ago the American Locomotive Co. built twenty Prairie (2-6-2) locomotives for the Wabash that embody a number of features not in common use, though they have been in the line of standard practice on the Burlington for a number of years. The engines were built at the Rogers Works, and are intended for fast freight service, though they are used, to some extent, in passenger work. Other engines of this same class have been in use on the Wabash for more than a year, and their performance is reported to be quite satisfactory both in the matter of tonnage capacity and cost of maintenance, and they are hauling from 1,750 to 2,100 tons on grades of from 26 ft. to 45 ft. to the mile. The design is practically a duplicate, except that the drivers are 70 in. in diameter instead of 69 in., of engines of the same type built for the Chicago, Burlington & Quincy.

There are three points on these engines that differ very materially from ordinary practice; the frames, the cylinders and the details of the valve gear.

The main frames are of cast steel with double front rails, but instead of having a splice in front of the leading driving wheels, the bottom rail is made integral with the rear portion of the frame and carried forward to the front of the cylinder only, and is fastened in the usual manner with bolts and



Prairie Locomotive; Wabash.

There is also a concrete and brick retaining wall on two sides of the battery chutes.

All line wires are run as shown on the plan. All case and box wiring is brought to labeled junction strips. All relay boxes, battery shunts, wells, etc., are located as shown on the plan; the idea being to make the plan represent as closely as possible the actual conditions on the ground. All trunking except that crossing tracks is run on stakes. With three exceptions there are no joints in wires except on the pole line and for boot legs.

Indirect Damages in Germany.

In Germany a man and his daughter started together on a journey. At an intermediate station where there was to be some delay the father went to a waiting-room while the daughter remained on the train. Another train ran into it and the daughter was badly mangled. When her father saw her in this state he received a shock from which he did not recover, but remained bereft of reason. Suit was brought on his account for damages, the claim being that his mental disability was caused by the railroad accident. On the first trial this claim was rejected, but a court of appeal admitted it. Then the railroad management appealed to the higher Imperial Court, which declared the railroad not to be responsible. The man was not injured by the accident, but by an effect of the accident; and the shock he received might have occurred just the same if he had first seen his daughter's mutilations the next day and at home.

wedge. The bolts are put in through a flange that drops down against the outside of this lower rail and is beneath the cylinder. The upper rail is held to the main frame by six 1¼-in. bolts and two keys, which, with a lip at the front end, relieve the bolts from shear. This splice is located at the usual place between the forward drivers and the cylinders. The rail itself extends out to the front buffer beam. With this arrangement by itself, the front buffer and pilot would be entirely dependent upon the upper rail for a support which would be manifestly insufficient. It is, therefore, supplemented by an inner rail set 11 in. on each side of the center line of the engine and connecting the saddle casting to the front buffer beam. This inner section of a frame has been a feature of the practice on the Burlington for a number of years, and has been very satisfactory. It is bolted to the saddle casting by four 1¼-in. bolts, besides being held by a wedge at the back end, as shown. The side elevation of the piece is given at A in the engraving of the frame. This arrangement evidently adds considerably to the stiffness of the front buffer. It has the same vertical support as in the case of the ordinary frame arrangement, but is backed at four points by the frames to sustain buffing shocks, instead of at two only. This must also serve to relieve the cylinders and saddles of a considerable portion of the stress to which they would otherwise be subjected.

The main frames extend back to the splice of the rear frame behind the third pair of drivers, and this rear frame is of the usual construction.

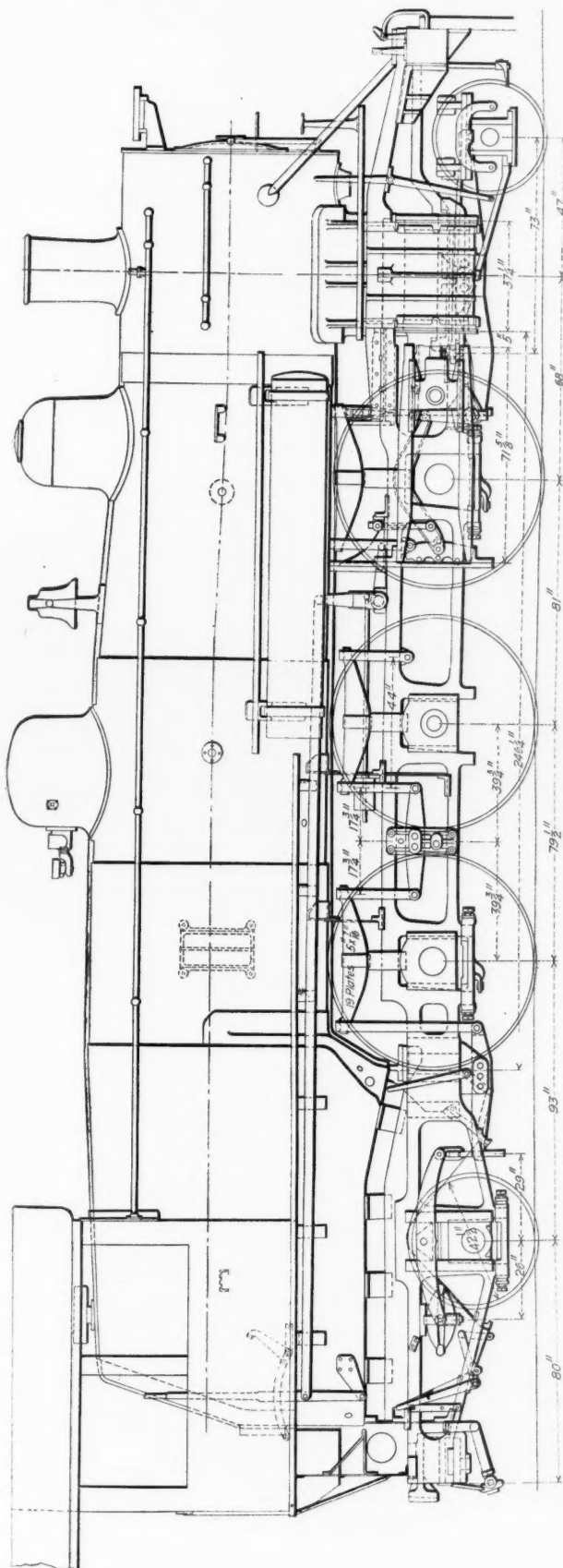
The cylinders offer, perhaps, even more of a variation from ordinary practice than the frames, and their peculiarity lies in the fact that the valve or steam chests are dropped down and set midway between the upper and lower rails and almost in a line with the frame centers. This is a radical change from the usual practice of putting the steam chest well up above the upper rail, and has the two-fold advantage

of shortening the posts down to minimum dimensions, and of making it possible to use an almost straight line connection from the eccentric to the valve stem.

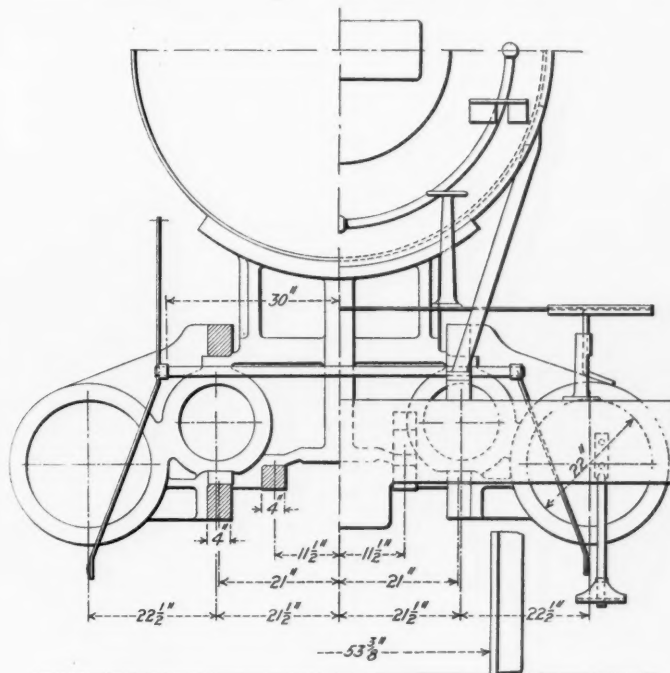
This location of the steam chest is, of course, by no means absolutely new, for it has been in use in European practice for a number of years and was found in the old inside-connected engines in use in the United States.

Placing the steam chest between the frame rails also permits of setting the rocker on the lower rail just ahead of the forward pedestal. In this case it is given a single upward extending arm inside the frames to which the valve rod and the transmission bar from the link are both connected. The transmission bar is a steel casting of I section, 7 in. deep at the center, and is carried, at the back end, by a swing hanger set just ahead of the link and supported by a bracket upon the top rail of the frame. Beyond this the link motion is of the usual type, and the whole is so arranged that all parts of the valve motion fall more nearly in the same vertical and horizontal planes than they do with the usual design of piston valves where the Stephenson motion is used.

With this combination of valve motion and cylinders, the



Prairie Locomotive; Wabash.



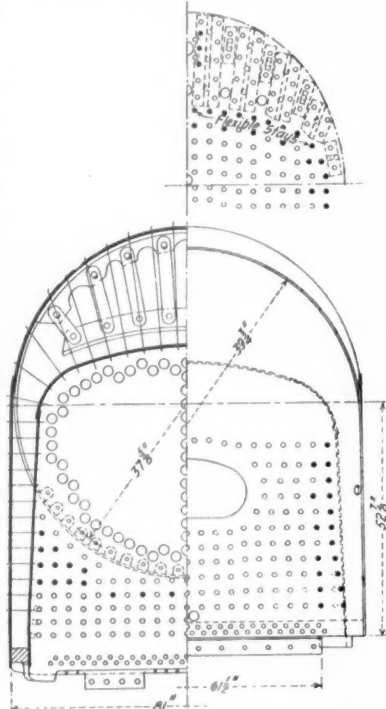
Front Elevation and Section at Cylinders.

reason for the removal of the front rail of the frame from its usual position is at once apparent. Were it to have been placed in the usual place, it would have been impossible to remove the front valve chest heads, to say nothing of the valve itself, so that not even an inspection could have been made. As it is, the whole of the space outside the truck wheel and back of the buffer is available.

The trailing truck is of the side-motion 'type with outside bearings, and is of a design that has been successfully used on the Burlington for a number of years. Other engines of this same type have also been built, the only change being that the driving wheels are 64 in. in diameter and the truck wheels 33½ in. The boiler is of the wagon-top type, with an inclined back head. In general shape it possesses no features of particular note. Engravings are presented, however, of the firebox, for the purpose of showing the grouping of the flexible stay-bolts. If comparisons are made among the engines that have been illustrated in the *Railroad Gazette* during the past few years, it will be seen that there is a tendency to increase the number of flexible bolts in use, though their distribution is far from uniform. In this boiler, though they are lacking at points where they are frequently found, they have, at the

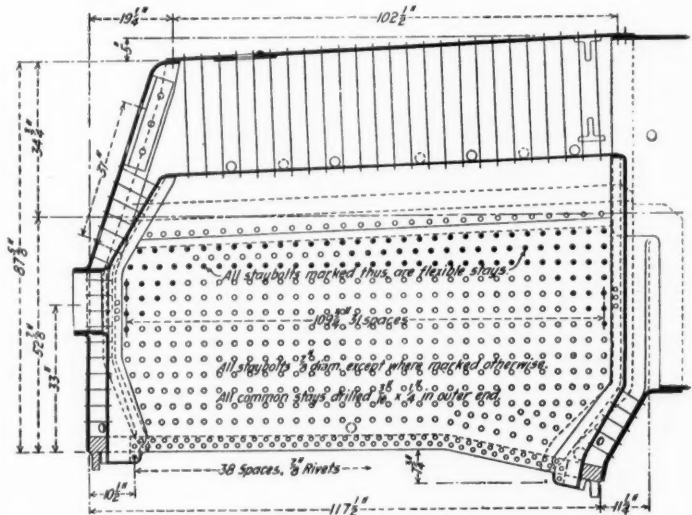
same time, crept beyond the ordinary limits and touched places that usually have the rigid stays. In the longitudinal section of the boiler they are to be found all along the top of the sides, two and three rows deep, and then dropping down at the ends next the tube and back sheets. Then in the rear elevation and cross section they will be found in a continuous row up the sides and across just beneath the crown sheet in the angle of the slope, while the whole triangular space in the throat sheet beneath the shell is filled with them with a few scattering along toward the center. Appearances, therefore, seem to indicate that the flexible bolt is doing what is expected of it, and that its more extended use is limited, possibly because of the expense, and probably because we have not yet decided as to just how far it will be profitable to use it.

Finally, attention is called to the tendency to increase the diameter of the wheels of the

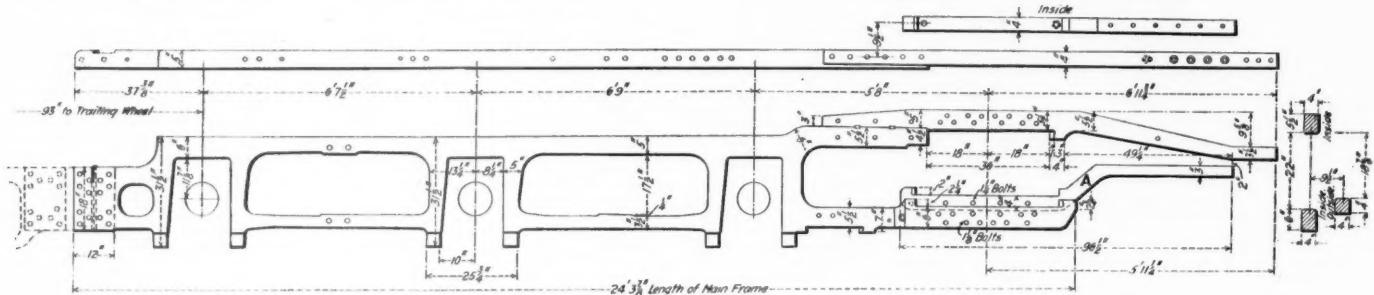


Cross Section End Rear Elevation of Firebox.

Heating surface, tubes	3,368.5 sq. ft.
" " firebox	190.5 "
" " total	3,559.0 "
Grate area	54.24 "
Steam pressure	200 lbs.
Weight on drivers	143,100 "
" " trailing truck	34,000 "
" " front truck	26,000 "
" " total engine	203,100 "
" " tender	155,317 "
Length over all	72 ft. 4 3/4 in.
Journals, main driving	9 1/2 x 12 "
" " front trucks	6 x 10 "
" " trailing truck	8 x 12 "
" " tender	5 1/2 x 10 "
Tank capacity water	7,700 gals.
Tank capacity coal	15 tons
Valve, travel	6 1/8 in.
" " lap	1 1/8 "
" " exhaust lap	1 1/8 in.
" " lead in full gear	1/32 in.
Tractive effort	32,912 lbs.



Longitudinal Section of Firebox.



Cast Steel Frame of Prairie Locomotive.

leading truck. To all intents and purposes, the front end of these engines is that of the mogul, and yet the time is not long past when it was considered that 30 in. was as large a diameter as could be used in this place. Raising the boiler, and the use of larger diameters for drivers, with the necessary elevation of the cylinders, and the greater permissible length of locomotives over all, have all contributed to this end, until now we are using, as in this case, wheels of 37 1/2 in. diameter.

The following are some of the principal dimensions of these engines:

Cylinder diameter	22 in.
Piston stroke	28 "
Wheels, diameter, drivers	70 "
" " " trailing	42 1/2 "
" " " front truck	37 1/2 "
" " " tender	33 1/2 "
Wheel base driving	13 ft. 4 1/2 in.
" " " total	30 " 8 1/2 in.
" " " engine and tender	63 " 4 1/4 in.
Boiler, diameter shell	70 in.
" " thickness of sheets	3/4 in.
Firebox length	108 1/8 "
" " width	72 1/4 "
" " thickness, crown, back and side sheets	3/8 in.
" " tube sheet	1/2 in.
" " water spaces, front	4 1/2 in.
" " water spaces, sides and back	4 "
Tubes, number	301
" " diameter	2 1/4 in.
" " length	19 ft.

Weight on drivers	4.35
Tractive effort	
Total weight	6.17
Tractive effort	
Tractive effort x diameter drivers	647.27
Heating surface	
Heating surface	65.80
Grate area	
Firebox heating surface	
Total heating surface	5.35*
Weight on drivers	40.20
Heating surface	
Total weight	57.07
Heating surface	
Volume of two cylinders, cu. ft.	12.32
Total heating surface	288.88
Volume 2 cylinders	
Grate area	4.40
Volume 2 cylinders	

*Per cent.

UNIFORM BILL OF LADING.

The Interstate Commerce Commission has approved and recommended for adoption, September 1 next, a uniform bill of lading. This subject was brought before the Commission in 1904 by commercial organizations in Official Classification territory, and a joint committee of shippers and carriers was appointed to formulate a suitable bill of lading and report the same to the Commission. The committee submitted a bill of lading which appears to have been agreed upon and consented to by the original petitioners and substantially all carriers in Official Classification territory. This was a year ago. After further conferences, some with the Commission and some by themselves, and after a few further changes, the committees agreed upon the form which is now approved, published and recommended by the Commission. It is in two forms, one to be printed on white paper and the other on yellow. One is for "straight" and one for "order" consignments. They will differ only on the face side, the conditions on the back being the same in each case. The "order" bill will possess a certain degree of negotiability, while the "straight" bill be non-negotiable. The bill recommended is a compromise between conflicting interests, but it represents the most intelligent and exhaustive efforts of those who undertook its preparation to agree upon a bill of lading which should be reasonably satisfactory to the public and the railroads. It imposes obligations of an important character which carriers have not heretofore assumed, and retains exemptions to which some shippers may object. As the Commission is advised, it is in some respects less favorable to the shipper than the local regulations of one or more states, but is more favorable to the shipper than the local laws or regulations of most of the states. The Commission retains the right, although approving the bill of lading conditions, to exercise its corrective authority as to any provisions therein which, under the test of experience, may be proper.

The Commission does not undertake to prescribe the bill of lading, because it is convinced such action would exceed its authority. It is understood, however, that the bill of lading will be adopted by all the railroads in Official Classification territory, and its acceptance is urged upon the carriers in other portions of the country. The Commission recommends that the uniform bill of lading be adopted from and after September 1, 1908.

The opening paragraphs of the two forms, together with the instructions for preparing the blanks, are printed below, as given in the pamphlet issued by the Interstate Commerce Commission; also the conditions to be printed on the backs of bills of lading, which are the same for both forms. Following are the principal differences between the paragraphs as now published, and as published by the Commission a year ago (*Railroad Gazette*, Sept. 20, 1907, p. 323):

Inspection of property under the order bill will not be permitted unless *provided by law*, etc. The italicized words have been added to the paragraph, and it appears in the conditions on the back, not on the face, of the bill.

Conditions.—Section 2, first paragraph, as now given, contains the substance of a paragraph which was formerly on the front of the form. The second paragraph of Section 2 has been decidedly changed in language, though not in substance. The clause empowering a carrier which pays a claim to recover from another carrier is now omitted. In the second paragraph of Section 3 the clause referring to a representation in writing by the shipper (as distinguished from an agreement) is new.

In the third paragraph of Section 3 the time—four months—is twice as long as in the earlier draft. In the last paragraph the last 13 words are new. Section 4: the carrier diverting cotton must do so at his own cost and risk.

In Section 5, third paragraph, the amplification of the term "station" to include a wharf or landing place is new.

In Section 8 "shipper" has been omitted, and the words "if required" have been added.

Section 9 omits the paragraph, formerly included, stipulating the carrier's liability when the rate includes marine insurance.

ORDER BILL OF LADING—ORIGINAL.

Received, subject to classifications and tariffs in effect on the date of issue of this original bill of lading, at 190.., from the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned and destined as indicated below, which said company agrees to carry to its usual place of delivery at said destination, if on its road, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the conditions, whether printed or written, herein contained (including conditions on back hereof) and which are agreed to by the shipper and accepted for himself and his assigns.

The surrender of this original order bill of lading properly indorsed shall be required before the delivery of the property. Inspection of property covered by this bill of lading will not be permitted unless provided by law or unless permission is indorsed on this original bill of lading or given in writing by the shipper.

NOTES.—The foregoing will appear on the front or first page of the bill of lading.

In connection with the name of the party to whom the shipment is consigned the words "Order of" shall prominently appear in print, thus:

"Consigned to order of....."

The bill of lading is to be signed by the shipper and agent of the carrier issuing same, and space shall be provided for this purpose.

The detail arrangement respecting other matters that customarily appear on the face of the bill of lading, such as name of destination, car numbers, routing, description of articles, weights, etc., will be prescribed by the uniform bill of lading committee.

The size of the bill of lading shall be 8½ in. wide by 11 in. long.

Order bills of lading shall be printed on yellow paper for convenient distinction from bills of lading covering other than "order" consignments.

.....Railroad Company.

BILL OF LADING—ORIGINAL—NOT NEGOTIABLE.

Received subject to classifications and tariffs in effect on the date of issue of the original bill of lading at 190.., from the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below, which said company agrees to carry to its usual place of delivery at said destination, if on its road, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the conditions, whether printed or written, herein contained (including conditions on back hereof) and which are agreed to by the shipper and accepted for himself and his assigns.

NOTES.—The foregoing will appear on the front or first page of the bill of lading.

The bill of lading is to be signed by the shipper and agent of the carrier issuing same, and space shall be provided for this purpose.

The detail arrangement respecting other matters that customarily appear on the face of the bill of lading, such as name of destination, car numbers, routing, description of articles, weights, etc., will be prescribed by the uniform bill of lading committee.

The size of the bill of lading shall be 8½ in. wide by 11 in. long.

Bills of lading covering what may be termed "straight con-

signments," being those other than "order consignments," shall be printed on white paper.

Bills of lading other than those covering "order consignments" shall be stamped "not negotiable."

The following conditions will appear on the back of the bill of lading:

CONDITIONS.

SECTION 1. The carrier or party in possession of any of the property herein described shall be liable for any loss thereof or damage thereto, except as hereinafter provided.

No carrier or party in possession of any of the property herein described shall be liable for any loss thereof or damage thereto or delay caused by the act of God, the public enemy, quarantine, the authority of law, or the act or default of the shipper or owner, or for differences in the weights of grain, seed, or other commodities caused by natural shrinkage or discrepancies in elevator weights. For loss, damage, or delay caused by fire occurring after 48 hours (exclusive of legal holidays) after notice of the arrival of the property at destination or at port of export (if intended for export) has been duly sent or given, the carrier's liability shall be that of warehouseman only. Except in case of negligence of the carrier or party in possession (and the burden to prove freedom from such negligence shall be on the carrier or party in possession), the carrier or party in possession shall not be liable for loss, damage, or delay occurring while the property is stopped and held in transit upon request of the shipper, owner or party entitled to make such request; or resulting from a defect or vice in the property or from riots or strikes. When in accordance with general custom, on account of the nature of the property, or when at the request of the shipper the property is transported in open cars, the carrier or party in possession (except in case of loss or damage by fire, in which case the liability shall be the same as though the property had been carried in closed cars) shall be liable only for negligence, and the burden to prove freedom from such negligence shall be on the carrier or party in possession.

Sec. 2. In issuing this bill of lading this company agrees to transport only over its own line, and except as otherwise provided by law acts only as agent with respect to the portion of the route beyond its own line.

No carrier shall be liable for loss, damage or injury not occurring on its own road or its portion of the through route, nor after said property has been delivered to the next carrier, except as such liability is or may be imposed by law, but nothing contained in this bill of lading shall be deemed to exempt the initial carrier from any such liability so imposed.

Sec. 3. No carrier is bound to transport said property by any particular train or vessel, or in time for any particular market or otherwise than with reasonable despatch, unless by specific agreement indorsed hereon. Every carrier shall have the right in case of physical necessity to forward said property by any railroad or route between the point of shipment and the point of destination; but if such diversion shall be from a rail to a water route the liability of the carrier shall be the same as though the entire carriage were by rail.

The amount of any loss or damage for which any carrier is liable shall be computed on the basis of the value of the property (being the bona fide invoice price, if any, to the consignee, including the freight charges, if prepaid) at the place and time of shipment under this bill of lading, unless a lower value has been represented in writing by the shipper or has been agreed upon or is determined by the classification or tariffs upon which the rate is based, in any of which events such lower value shall be the maximum amount to govern such computation, whether or not such loss or damage occurs from negligence.

Claims for loss, damage or delay must be made in writing to the carrier at the point of delivery or at the point of origin within four months after delivery of the property, or, in case of failure to make delivery, then within four months after a reasonable time for delivery has elapsed. Unless claims are so made the carrier shall not be liable.

Any carrier or party liable on account of loss of or damage to any of said property shall have the full benefit of any insurance that may have been effected upon or on account of said property, so far as this shall not avoid the policies or contracts of insurance.

Sec. 4. All property shall be subject to necessary coöperation and baling at owner's cost. Each carrier over whose route cotton is to be transported hereunder shall have the privilege, at its own cost and risk, of compressing the same for greater convenience in handling or forwarding, and shall not be held responsible for deviation or unavoidable delays in procuring such compression. Grain in bulk consigned to a point where there is a railroad, public, or licensed elevator, may (unless otherwise expressly noted herein, and then if it is not promptly unloaded) be there delivered and placed with other grain of the same kind and grade without respect to ownership, and if so delivered shall be subject to a lien for elevator charges in addition to all other charges hereunder.

Sec. 5. Property not removed by the party entitled to receive it within 48 hours (exclusive of legal holidays) after notice of its arrival has been duly sent or given may be kept in car, depot, or place of delivery of the carrier, or warehouse, subject to a reasonable charge for storage and to carrier's responsibility as warehouseman only, or may be, at the option of the carrier, removed to and stored in a public or licensed warehouse at the cost of the owner and there held at the owner's risk and without liability on the part of the carrier, and subject to a lien for all freight and other lawful charges, including a reasonable charge for storage.

The carrier may make a reasonable charge for the detention of any vessel or car, or for the use of tracks after the car has been held 48 hours (exclusive of legal holidays), for loading or unloading, and may add such charge to all other charges hereunder and hold such property subject to a lien therefor. Nothing in this section shall be construed as lessening the time allowed by law or as setting aside any local rule affecting car service or storage.

Property destined to or taken from a station, wharf, or landing at which there is no regularly appointed agent shall be entirely at risk of owner after unloaded from cars or vessels or until loaded into cars or vessels, and when received from or delivered on private or other sidings, wharves or landings shall be at owner's risk until the cars are attached to and after they are detached from trains.

Sec. 6. No carrier will carry or be liable in any way for any documents, specie, or for any articles of extraordinary value not specifically rated in the published classification or tariffs, unless a special agreement to do so and a stipulated value of the articles are indorsed hereon.

Sec. 7. Every party, whether principal or agent, shipping explosive or dangerous goods, without previous full written disclosure to the carrier of their nature, shall be liable for all loss or damage caused thereby, and such goods may be warehoused at owner's risk and expense or destroyed without compensation.

Sec. 8. The owner or consignee shall pay the freight and all other lawful charges accruing on said property, and, if required, shall pay the same before delivery. If upon inspection it is ascertained that the articles shipped are not those described in this bill of lading, the freight charges must be paid upon the articles actually shipped.

Sec. 9. Except in case of diversion from rail to water route, which is provided for in section 3 hereof, if all or any part of said property is carried by water over any part of said route, such water carriage shall be performed subject to the liabilities, limitations and exemptions provided by statute and to the conditions contained in this bill of lading not inconsistent with such statutes or this section, and subject also to the condition that no carrier or party in possession shall be liable for any loss or damage resulting from the perils of the lakes, sea, or other waters; or from explosion, bursting of boilers, breakage of shafts, or any latent defect in hull, machinery or appurtenances; or for collision, stranding or other accidents of navigation, or from prolongation of the voyage. And any vessel carrying any or all of the property herein described shall have the liberty to call at intermediate ports, to tow and be towed, and assist vessels in distress, and to deviate for the purpose of saving life or property.

The term "water carriage" in this section shall not be construed as including lighterage across rivers or in lake or other harbors, and the liability for such lighterage shall be governed by the other sections of this instrument.

Sec. 10. Any alteration, addition, or erasure in this bill

of lading which shall be made without an indorsement thereof hereon, signed by the agent of the carrier issuing this bill of lading, shall be without effect, and this bill of lading shall be enforceable according to its original tenor.

The Interstate Commerce Commission report gives the name of Levy Mayer as the representative who appeared before the Commission for the commercial organizations, and George F. Brownell as the one who appeared for the railroads. The full committees were:

Commercial Interests.—J. E. Wilder, F. T. Bentley, O. F. Bell and D. A. Eckert, with Levi Mayer as counsel.

Railroads.—C. C. McCain, Trunk Line Association; H. B. Chamberlain, Erie; George F. Randolph, Baltimore & Ohio; D. T. McCabe, Pennsylvania Lines; B. B. Mitchell, New York Central Lines; B. D. Caldwell, Delaware, Lackawanna & Western; George D. Dixon, Pennsylvania. The counsel were: George F. Brownell, Erie; G. S. Patterson, Pennsylvania; Henry Russell, Michigan Central; A. P. Burgwin, Pennsylvania Lines, and F. A. Farnham, New York, New Haven & Hartford.

A PORTABLE STORAGE MACHINE.

The accompanying photograph shows a material handling machine in operation at the storage yard of the Illinois Steel Co. at Stockton, Ind. It is made by the Hamilton Manufacturing Co., Columbus, Ohio. The machine consists of a system of conveyors which handle coal and coke both into and from

the storage yards. All operations are thus performed by one self-contained unit, instead of by entirely separate systems. The machine operates on its own track. To increase the storage capacity of a yard, the only expense necessary, aside from the value of land, is the cost of lengthening the machine track and the trestles from which the cars are dumped. In the Stockton yard, the machine handles material from any part of the present yard, which is 100 ft. wide and over a quarter mile long. There is room in the Stockton yard to extend the siding on which the machine runs three-quarters of a mile further if necessary. At present, there are about 100,000 tons of coke in storage. The machine is operated by three men and it delivers the coke to the car at the rate of three tons a minute, at a cost of one cent a ton. It does this without damaging the material.

The first cost is small, and the operating expenses are comparatively low. The cost of handling material into and out of storage is less than 2 cents a ton, or about \$1 a car, which compares with a cost of about 20 cents a ton in loading from storage by hand.

This machine has numerous applications and the makers build different sizes, ranging from the mine car loader, having a capacity of 30 to 40 cu. ft. a minute, to machines running as high as 300 cu. ft. a minute. It is also adapted for the use of contractors in tunnel work, as well as in mines in general. The storage machine in its different sizes will handle coal, coke, loose rock, tailings, fire-clay, gravel, sand and other loose materials, at a cost claimed to be considerably less than that of any other present methods.



Hamilton Storage Machine Loading Coke from Storage.

General News Section.

The Philadelphia & Reading has closed its telegraph school at Reading, Pa. The number of telegraphers graduated is said to have been over 90.

The "telegraphone"—telephone and Morse telegraph on the same wire—is now in use on the Boston & Maine from Boston to Rotterdam Junction, 212 miles.

The Canadian Parliament has passed a law providing that henceforth telegraph and telephone companies shall be under the supervision of the Dominion Railway Commission.

On the afternoon of July 8 the grain elevator of the Boston & Albany, at East Boston, Mass., was destroyed by fire, together with a large quantity of freight and a number of freight cars; loss, \$1,500,000.

New York City Division No. 8 of the Order of Railroad Station Agents was formed last week by E. H. Morton, of Boston, President of the order. The chief of the New York City division is A. R. Hume, of Ossining, N. Y.

The Railroad Commission of Louisiana will hold a hearing at Baton Rouge July 22 to determine whether an order should be issued requiring all railroad companies crossing each other at grade to install safe and suitable interlocking devices within 90 days.

According to a press despatch from Georgetown, Del., July 6, a freight train on the Delaware division of the Philadelphia, Baltimore & Washington had to be held over night at that place recently, because the trainmen had been on duty 16 hours, and, under the law, could go no further.

Ninety-two citizens of Memphis, Tenn., have filed a petition with Justice Guthrie, of the Fifteenth Civil District, for an order to compel the Union Railway, a belt line, to operate a passenger train service through and around Memphis. This line, which has been in operation for four years, has never carried passengers.

In the month of May the workmen on the Pacific extension of the Chicago, Milwaukee & St. Paul, piercing the tunnel under the Bitter Root mountains in Montana, excavated 538 linear feet, believed to be the best performance of the kind on record. R. W. Day, the engineer, expects to finish the tunnel by next March.

The Executive Committee of the General Managers' Association of Chicago recommend the appointment of Benjamin Thomas, late President of the Chicago & Western Indiana, as permanent Chairman of the Association. Slason Thompson, for some years past manager of the Railway News Bureau of the Association, is to retire September 1.

According to a Kansas City paper the practice of requiring passengers to show their tickets on entering trains is now general throughout the state of Missouri. This practice was made necessary by the terms of the low-fare law, passed by the legislature last year, under which the railroads cannot impose a penalty on passengers for not buying tickets.

The Attorney-General has begun proceedings against 12 railroads for violation of the safety appliance law, namely: the Cleveland, Lorain & Wheeling, the Baltimore & Ohio, the Chicago & Alton, the Chicago, Burlington & Quincy, the Chicago Great Western, the Chicago, Milwaukee & St. Paul, the Detroit, Ironton & Toledo, the Galveston, Harrisburg & San Antonio, the Illinois Central, the Lake Shore & Michigan Southern, the Pennsylvania and the Pittsburgh, Fort Wayne & Chicago.

The Railroad Commission of Louisiana has ordered the Yazoo & Mississippi Valley to install by July 24, and operate, on its Clinton division, between Clinton and Ethel, a passenger train service with schedules so arranged that the Clinton division trains shall arrive at Ethel not more than 30 minutes before the arrival and leave not more than 30 minutes after the departure of the main line passenger trains. The company is given the privilege of using motor cars instead

of steam trains if this can be done with safety and is practicable.

The Attorney-General of Montana has filed a suit against the Northern Pacific to compel it to observe an order issued by the commission last April, directing the company to run its engines forward when running down Blossberg hill, a few miles west of Helena, instead of backward, as has been the practice. Blossberg, or Mullen, hill is very steep, and many wrecks have occurred there, principally due to runaway engines. The order referred particularly to class "Z" helper engines. The complaint charges that up to the present time the road has been backing its class "Z" engines from Blossberg to Helena in violation of the order.

On July 15, Judge Kohlsaat, of the United States Circuit Court at Chicago, handed down a decision in the case of the government against the Chicago, Indianapolis & Louisville, upholding the ruling of the Interstate Commerce Commission that exchange transportation for advertising is illegal under the Hepburn Act. The Monon had contracted with *Munsey's Magazine* to exchange transportation for the equivalent cash value of advertising. The court held that such contracts render impracticable the effectual enforcement of the provisions of the law covering free transportation. Counsel for the Monon announces that an appeal will be taken to the Supreme Court.

In the United States Court at Helena, Mont., July 13, suit was instituted by the government against the Northern Pacific Railroad, the Rocky Fork Coal Co. and the Northwestern Improvement Co. to recover title to valuable coal lands in Cardon county which, it is alleged, were procured through misrepresentation. The lands are declared to be worth more than \$100,000 and to embrace rich coal fields. The lands are chiefly valuable for their large deposits of coal and were selected by the railroad under the provisions of its land grant in 1899 in lieu of areas embraced in the Mount Rainier National Park and Pacific forest reserve in Washington. The government charges that "the verifications of the selections were each false, as the railroad company well knew." Attorney-General Bonaparte, the District Attorney for Montana, three special district attorneys and a well known local law firm appear as counsel for the government.

Forty Years of Railroad Gazette Work.

On July 10, S. Wright Dunning celebrated the fortieth anniversary of his beginning work on the *Railroad Gazette*—six weeks after that paper became the *Railroad Age Gazette*. Mr. Dunning was an editor of the *Railroad Gazette* from 1868 until 1887; from 1870 to 1884 Mr. Forney was associated with him and had charge of mechanical matters, while Mr. Dunning dealt with traffic, transportation and finance. Since Mr. Dunning's retirement from the staff, in 1886, he has been a constant contributor, and is now doing work which could not be duplicated, in his exceedingly able rendering of foreign railroad affairs into the Foreign Railroad Notes, which have value all out of proportion to their length.

Pennsylvania Railroad Y. M. C. A.

Reports on the past season's work received from the 25 branches of the Y. M. C. A. on the Pennsylvania Railroad show a paid membership of something over 10,000, the largest branch being at Philadelphia, with 1,926 members. The total attendance for the season was 682,723. The attendance at all educational meetings was 15,543, and at religious meetings 72,288. The growth of the Y. M. C. A. work on the Pennsylvania has been due to the interest taken in it by the rank and file. Every member pays regular dues, the members themselves, at the present time, contributing 60 per cent. of the expenses, and the company 40 per cent. The company and

many of the leading officials take active part in the work of the association. In addition, the company furnishes instructors for many of the educational classes, especially those in telegraphy, air-brake instruction, and such subjects. President McCrea in a recent letter said: "The work carried on by the Railroad Department of the Young Men's Christian Association has now developed to so general an extent that the association can no longer be considered other than a permanent institution; in fact, the results accomplished have been so signally successful that these branches are now rightly recognized as an important factor in general railroad work."

Committees of Association of American Railway Accounting Officers.

The names of the officers and members of the Executive Committee of the Association of American Railway Accounting Officers for the year 1908-1909 were given in *The Railway Age* of May 8, 1908, page 666. William J. Hobbs, Fourth Vice-President and General Auditor of the Boston & Maine, and President of the association, announces the appointment of the following additional committees:

Standing Committee on Corporate, Fiscal and General Accounts.—A. H. Plant, Washington, D. C., Chairman; C. G. Phillips, 143 Dearborn street, Chicago, Ill., Secretary.—Terms expire 1909: M. P. Blauvelt, Comptroller, Erie; S. B. Schuyler, General Auditor, Missouri Pacific; C. I. Sturgis, General Auditor, Chicago, Burlington & Quincy; N. J. Power, General Auditor, Grand Trunk; R. A. White, Auditor, New York Central. Terms expire 1910: W. E. Bailey, General Auditor, Atchison, Topeka & Santa Fe; R. I. Farrington, Second Vice-President, Great Northern; C. F. Krebs, Comptroller, Illinois Central; G. N. Wilson, General Auditor, Lehigh Valley; Erastus Young, General Auditor, Union Pacific. Terms expire 1911: H. A. Gray, Comptroller, Northern Pacific; W. J. Hobbs, Fourth Vice-President and General Auditor, Boston & Maine; S. C. Johnson, General Auditor, St. Louis Southwestern; M. M. Kirkman, Vice-President, Chicago & North-Western; M. Riebenack, Comptroller, Pennsylvania. Terms expire 1912: H. D. Bulkley, Comptroller, Baltimore & Ohio; P. A. Hewitt, Auditor, Cleveland, Cincinnati, Chicago & St. Louis; A. H. Plant, Comptroller, Southern; J. W. Renner, Comptroller, Pennsylvania Lines West of Pittsburgh; J. L. Cramer, Vice-President and Comptroller, Pere Marquette. Terms expire 1913: Carlton Hillyer, Auditor, Georgia Railroad; S. M. Hudson, Auditor, Ft. Worth & Denver City; J. A. Taylor, General Auditor, Central Railroad of New Jersey; T. J. Tobin, Auditor, Wabash; W. H. Williams, Third Vice-President, Delaware & Hudson.

Standing Committee on Freight Accounts.—R. S. Dousman, Philadelphia, Pa., Chairman.—Holdovers: Bertram Young, Auditor Freight and Ticket Accounts, Delaware, Lackawanna & Western; O. D. James, Auditor Freight Receipts, Cincinnati & Ohio; Jefferson Justice, Assistant Comptroller, Pennsylvania; W. T. McCulloch, Auditor Freight Accounts, New York Central & Hudson River; W. H. Anderson, Freight Auditor, Union Pacific; F. W. Meyer, Freight and Passenger Accounts, Kansas City Southern; R. S. Dousman, Auditor Traffic, Lehigh Valley; J. R. Brice, Freight Auditor, Chicago, Milwaukee & St. Paul. New Appointees: J. O. Clifford, Freight Auditor, Chicago & North-Western; R. E. Berger, Auditor Freight Accounts, Wabash; C. G. Weaver, Auditor Freight Traffic, Chicago, Rock Island & Pacific; J. F. Shepherd, Auditor Freight Receipts, Illinois Central; C. J. Flanagan, Auditor Freight and Telegraph Receipts, Canadian Pacific; E. E. Kruthoffer, Auditor Freight Accounts, Cleveland, Cincinnati, Chicago & St. Louis; F. A. Clark, Auditor Traffic, Erie.

Standing Committee on Passenger Accounts.—A. Herman, Chicago, Ill., Chairman.—Holdovers: C. H. Poulmair, Auditor Passenger Receipts, Baltimore & Ohio; L. P. Ecker, Auditor, Hocking Valley; A. D. Joslin, Auditor Passenger Receipts, Illinois Central; J. C. Thurman, General Auditor, Green Bay & Western; F. A. Wyman, Auditor Passenger Receipts, Lake Shore & Michigan Southern; G. H. Lamkin, Auditor, Louisville, Henderson & St. Louis; R. L. Porter, Auditor, Wheeling & Lake Erie. New Appointees: A. Herman, Auditor Passenger Receipts, Chicago, Rock Island & Pacific; Charlton Messick, Freight and Passenger Accounts, St. Louis South Western; W. R. Wagner, Passenger Accounts, Chicago & Eastern Illinois; A. B. Bierck, Auditor, Long Island; G. W. Poe, Ticket Auditor, Cincinnati & Ohio; M. H. Chamberlin, Auditor, Rutland; J. F. Howe, Auditor Passenger Receipts, Denver & Rio Grande; W. L. Bird, Auditor, Norfolk & Southern.

Standing Committee on Disbursement Accounts.—L. G. Scott, Minneapolis, Minn., Chairman.—Holdovers: D. C. Copperstone, Auditor Disbursements, Pennsylvania Lines West of Pittsburgh; L. G. Scott, Auditor, Minneapolis & St. Louis; C. W. Moore, Auditor Disbursements, Illinois Central; W. G. Crabbe, Auditor, Central Vermont; H. J. Cronin, Assistant Auditor, Chicago & Eastern Illinois. New appointees: J. G. Livengood, Auditor Disbursements, Erie; A. L. Conrad, Auditor Disbursements, Atchison, Topeka & Santa Fe; C. E. Dudley, Auditor Expenditures, Chicago, Milwaukee & St. Paul; H. D. Foster, Assistant Auditor, Chicago, Burlington & Quincy Lines West of the Missouri river.

Standing Committee on Car Accounts and Miscellaneous Revenue Accounts.—J. S. Donaldson, Philadelphia, Pa., Chairman.—Holdovers: J. H. Bradbury, General Auditor, Colorado & Southern; Frank M. Luce, Auditor Car Accounts, Chicago & North-Western; W. L. Seeling, Auditor, Missouri, Kansas & Texas; R. D. Cobb, Auditor, St. Louis & South Western of Texas. New appointees: E. H. Lycett, Auditor Disbursements, Missouri Pacific; W. H. Davies, Comptroller, Delaware & Hudson; W. H. Baumes, Comptroller, Buffalo & Susquehanna; F. C. Plaisted, General Auditor, Bangor & Aroostook; J. S. Donaldson, Auditor Miscellaneous Receipts and Accounts, Pennsylvania.

Standing Committee on Statistics.—John Hurst, Pittsburgh, Pa., Chairman.—Holdovers: R. Toombs, Comptroller and Auditor, Wisconsin Central Lines; J. L. Cramer, Comptroller, Cincinnati, Hamilton & Dayton; T. O. Edwards, Auditor, Morgan's Louisiana & Texas. New appointees: John Hurst, General Accounts, Pennsylvania Lines West of Pittsburgh; T. W. Roby, Comptroller, Seaboard Air Line; W. G. Johnson, Assistant Comptroller, Northern Pacific; H. S. Hastings, Auditor and Comptroller, Pittsburgh, Shawmut & Northern; C. W. Gardner, Auditor, Minneapolis, St. Paul & Sault Ste. Marie.

Standing Committee on Accounts with the Government.—G. W. Booth, Baltimore, Md., Chairman.—Holdovers: M. M. Kirkman, Vice-President, Chicago & North-Western; G. W. Booth, Assistant Comptroller, Baltimore & Ohio; M. Riebenack, Comptroller, Pennsylvania; Erastus Young, General Auditor, Union Pacific; C. B. Hayes, Auditor, Southern. New appointees: Frank Nay, General Auditor, Chicago, Rock Island & Pacific; J. G. Drew, Comptroller, Great Northern; A. Douglas, Vice-President and General Auditor, St. Louis & Santa Fe; H. C. Prince, Comptroller, Atlantic Coast Line.

Standing Treasury Committee.—J. S. Ford, Chicago, Ill., Chairman.—Terms expire 1909: J. F. Dinkey, Auditor and Treasurer, Buffalo, Rochester & Pittsburgh; J. E. Howard, Treasurer, Pere Marquette; S. L. Shannon, Comptroller and Treasurer, Intercolonial of Canada; E. L. Copeland, Treasurer, Atchison, Topeka & Santa Fe. Terms expire 1910: J. S. Ford, Secretary and Auditor, Chicago & Eastern Illinois; D. W. Bigoney, Treasurer, Erie; W. F. Dudley, Assistant General Auditor, Chicago, Milwaukee & St. Paul; J. F. Titus, Assistant to President, Illinois Central; T. H. B. McKnight, Treasurer, Pennsylvania Lines West of Pittsburgh.

The following special committees have been appointed:

To Attend National and State Railroad Commissioners' Convention.—C. I. Sturgis, Chairman, General Auditor, Chicago, Burlington & Quincy; J. O. Clifford, Freight Auditor, Chicago & North-Western; J. A. Taylor, General Auditor, Central of New Jersey.

To Co-operate with Mr. H. C. Adams as to Form of Return for Terminal Companies, etc.—C. C. Chace, Chairman, Auditor Chicago Junction; H. D. Heuer, Assistant Auditor Terminal Association of St. Louis, Mo.; C. C. Ripley, Auditor, Kansas City Belt; G. W. Booth, Assistant Comptroller, Baltimore & Ohio; J. B. Brittain, First Assistant to Comptroller, Pennsylvania Lines West of Pittsburgh; J. E. Merion, Auditor, Indianapolis Union Railway, Indianapolis, Ind.; C. O. Kalman, Auditor, Chicago Great Western.

Conference with American Railway Association.—Frank Nay, Chairman, General Auditor, Chicago, Rock Island & Pacific; Con. F. Krebs, Comptroller, Illinois Central; G. E. Hustis, General Auditor, Delaware, Lackawanna & Western; I. G. Ogden, Third Vice-President, Canadian Pacific; G. S. Hobbs, Second Vice-President and Comptroller, Maine Central.

Conference with the Freight Claim Association.—Thos Edson, Chairman, Auditor Freight Accounts, Michigan Central; W. D. Byemer, Comptroller, Central of Georgia; M. F. Molloy, Comptroller, Cincinnati, New Orleans & Texas Pacific; John T. Denniston, Auditor, Star Union Line; Stuart H. McIntosh, Assistant General Auditor, Boston & Maine.

Conference with Standing Committee of American Association of General Passenger and Ticket Agents.—J. H. Shearing, Chairman, Auditor Passenger Receipts, Canadian Pacific; A. D. Joslin, Auditor Passenger Receipts, Illinois Central; A. J. Gillingham, Auditor Passenger Receipts, Pennsylvania; G. S. Cooper, Auditor Ticket Accounts, Chicago, Burlington & Quincy; C. B. Hayes, Auditor, Southern.

On Standard Forms of Records and Reports for Station Agents and Conductors.—George B. Dunbar, Chairman, Assistant General Auditor, Chicago, Burlington & Quincy; J. E. Baxter, Assistant General Auditor, Atchison, Topeka & Santa Fe; J. M. Lyon, Auditor Freight Receipts, Pennsylvania Lines West of Pittsburgh; T. O. Edwards, Auditor Morgan's Louisiana & Texas; W. H. Smith, Auditor, Western of Alabama.

Pennsylvania Railroad Veterans.

The Pennsylvania Railroad has 1,350 active employees who have been with the road 40 years or more, and there are 1,013 who served the company more than 40 years, but are now retired and are receiving pensions. In the census of the civil service of the United States July 1, 1907, those who had been in the service of the national government for more than 50 years numbered 40 men and one woman. The Pennsylvania Railroad to-day has upon its payrolls 316 men who have been in its service more than 50 years.

Of the employees of the Pennsylvania Railroad in active service, 115 are 61 years of age, 118 are 64 years old, 114 are 67, and 105 are 69. Sixty-seven of the 85 principal officers of the Pennsylvania Railroad Company started as beginners, and, with few exceptions, have been with it ever since. Their average age is 51 years, and the average length of service is 26 years.

William Durham, who, as a mule driver, entered the service of the Delaware & Raritan Canal in June, 1839—even before the Pennsylvania Railroad was chartered—has been upon the payroll for the longest period. At the time of his retirement on pension, he was a pilot on a boat in New York harbor.

"Regulating" Interstate Traffic Without Aid of Federal Government.

Railroad men of New Orleans say that there is no question that the state of Louisiana will have a good case when it attacks the legality of the acts of the Texas Railroad Commission in forcing Texas cotton away from Shreveport and to Texas towns. When the Texas Commission originally put its rules into effect, it was suggested by some of the roads that Louisiana obtain an injunction on the ground that the action of the Commission is in restraint of trade. It is on this ground that it is still believed the Texas Commission's rules can be attacked. The principal effect of the Commission's acts has been to abolish the practice of concentrating cotton at

Shreveport, a practice which was especially profitable to the Shreveport cotton compresses and cotton merchants.—*The Picayune*.

The Political Aspect of the Accident Record.

While it is true that there are a half million or so railroad cars not at work, let us be thankful that the magnificent distances between trains during the last eight months of Republican prosperity have resulted in fewer railroad wrecks.—*Louisville Courier-Journal*.

Pennsylvania Railroad Forestry.

The Pennsylvania Railroad Forestry Department has this spring planted 625,000 trees, making 2,425,000 trees which have been set out by the road since it undertook tree planting upon a comprehensive scale. This is the largest forestry enterprise undertaken as yet by any corporation.

Much European plant material has been imported; principally 209,000 seedlings. All of them not large enough to be planted in their permanent sites have been set out in transplant rows in the new forest nursery established this year by the company at Morrisville, Pa. In the seed beds were sown this year 25 bushels of acorns and nuts, 370 lbs. of other hardwood seeds, and 75 lbs. of conifer seeds. In addition, 300,000 seedlings were permanently planted in land belonging to the company. The company has this year begun the propagation of ornamental trees and plants for beautifying its property, and all station grounds and unoccupied spaces on the right of way eventually will be parked.

Besides re-foresting old farmland and other open areas as in the past, the field planting this year has included some areas from which logs were cut in 1907 and certain old locust plantations which needed interspersed trees to stimulate their growth in height and to regulate their form development have been underplanted.

Causes and Sources of Claims.

The stream of loss and damage claims may be likened to a great river. The sources of the stream, the little springs, are the General Managers, the Traffic Managers, the classifications, the rates, the Contracting Agents, the people who ship, who haul the goods, who receive the goods, who load and handle cars, who forward the cars, who receive the cars and the goods.

Why the General Managers? Those gentlemen have, year by year, endeavored to reduce the "percentage of Operation to Earnings." They have pared here, and cut off there, have made two men do the work where three had been employed, or they have allowed a stipend so small that capable men could not be had. Comes a shipper with a car of plows. His teams reach the yard clerk. This gentleman enjoys a luxurious cabin and a salary of \$40 per. His signature on a shipping ticket binds the company he represents a good deal tighter than the solemn promises of any "gentleman's agreement." He knows quite as much as one has a right to expect for \$40 per, but he doesn't know it all. He sees the plows and when the car is piled full he affixes the company's agent's stamp, and his own initials, and the shipper retires from the scene. It is Saturday. Before Monday dawns it has dawned on Mr. Shipper that he made a break. He looks up the receipt he holds, and which he made out himself, and discovers, sure enough, that it reads Smith's Cross Roads, Texas, when the Smith's Cross Roads he wants to reach is in Louisiana. He hastily prepares a new set of tickets, hurries to the palatial cabin of the clerk, where he explains the matter, and ultimately secures an exchange of tickets, on an assurance that if the clerk cannot get the car stopped he will make him safe. But the car has a two days' start, and efforts are futile. The car gets to Texas and has to be ordered back to Louisiana. It has accumulated \$191 freight charges. The consignee "kicks." The shipper, good man, wires him he holds a clear receipt, and not to accept unless the agent will deliver the car free of charges. By this time everybody on the job knows the car was misshipped, and, to avoid having the load of

plows on hand, the agent is instructed to comply with the demand of the shipper made through the consignee, to deliver without collecting and to make claim for "relief." When the shipper, honest man, is called upon, he produces as the original ticket the one he procured by persuasion, and he goes squarely back on the \$40 clerk. Whereby he is ahead the amount of freight which should have been paid for direct haul, plus the cost of his own error. The price of his mendacity cannot of course be figured. This claim has two, possibly three, springs. The error and dishonesty of Mr. Shipper and the lack of intelligence or information of the yard clerk, who is the incompetent substitute for a better informed and more capable man because of the General Manager's desire to still further pare his cheese-rind to less than his last year's operating sheet showed.—*S. D. Webster, St. Louis*.

Traffic News.

Coal shippers at Pittsburgh, Pa., announce that the railroads have promised to make no demurrage charge on coal cars at Lake Erie terminals before August 1.

The *Wall Street Journal*, after interviewing traffic officers of the principal railroads centering in New York City, reports that passenger traffic on practically all of the lines is as good as it was last year.

The Adams, the American, the United States and the Wells-Fargo express companies have been ordered by the Interstate Commerce Commission on complaint of Joseph Ullman to reduce the rate for transportation of raw furs in boxes and bales from St. Paul to New York City from \$4.50 per 100 lbs. to \$3.50.

The Union Pacific has asked permission of the Nebraska Railroad Commission to withdraw all of its "short line" passenger rates and to restore all these rates to the basis of 2 cents a mile. A "short line" rate is one between two points which are connected by two or more lines of railroad, the rate, by the shortest line being adopted on all the others.

The Grand Trunk has made a long-term agreement with the Northern Navigation Co. of Ontario, under which the N. N. line of steamers, now consisting of eight passenger and two freight steamers, will be run in connection with the Ontario and Quebec lines of the Grand Trunk, connecting them directly with Sault Ste. Marie, Port Arthur, Fort William and Duluth.

The New York Public Service Commission, Second district, has called on the railroads of the state to appear at Albany this week and answer complaints of shippers who claim that the rule, now enforced with unusual strictness, requiring every piece of freight to be marked, is unjust. The complaints come from shippers of brick, bar iron and other articles which are shipped loose in large lots.

The Union Pacific has decided to comply with the order of the Interstate Commerce Commission requiring it to desist from paying elevator allowances to the Peavey Grain Company at Omaha and Kansas City; though it is possible that the grain company will secure an injunction from the courts to compel the continued payment of these allowances, for the road's contract with the Peavey company providing for the payment of allowances has repeatedly been held by the road's counsel to be legal.

The Union Stock Yards Company, of South Omaha, Neb., having been declared by the courts to be a common carrier, has filed a petition with the Nebraska Railway Commission for permission to double its switching charges, most of which are paid by the railroads that employ its facilities for moving live stock in and out of the yards. The following are the increases in charges that it desires to make: On live stock received from or delivered to a connecting line, from 50 cents to \$1 a car; on commodities received from a connecting line for industries situated on the tracks of the complainant, from \$1 to \$2 a car; on commodities switched from the transfer track of one road to the transfer track of another, from \$1 to \$2 a car, such cars when empty to be returned free; for

switching empty cars from the transfer tracks of one road to the transfer tracks of another, from 50 cents to \$1 per car; for switching cars from one part of the company's yards to another or from the tracks of one firm to those of another, from 50 cents for empty and \$1 for loaded to \$1 per car, whether empty or loaded.

The members of the Interstate Commerce Commission are arranging their business so that they can take their annual vacations. The only commissioner now in Washington is Chairman Knapp. He will not go away probably before the first of August, and then will be relieved by another member. Commissioner Harlan will spend his vacation at Essex, N. Y.; Commissioner Clark at his home in Iowa; Commissioner Prouty at Newport, Vt.; Commissioner Cockrell at New London, Conn.; Commissioner Lane in California, and Commissioner Clements at Gaithersburg, Va.

The railroads from St. Louis to the Southwest have filed with the Interstate Commission, effective Aug. 10, freight tariffs showing advances as follows: First class, St. Louis to Texas points, from \$1.37 to \$1.47 per 100 lbs.; second, from \$1.07 to \$1.25; third, from \$1.04 to \$1.12; fourth, from 96 cents to 1.02; fifth, from 75 to 80 cents; class A, from 79 to 85 cents; B, from 65 to 70 cents; C, from 58 to 62 cents; D, from 46 to 50 cents; E, from 39 to 43 cents. Advances are to be made also in commodity rates. Care has been taken to prevent any disturbance of the relative rate adjustment from large jobbing and manufacturing centers to points in Texas and the Southwest.

Traffic and legal officers of the transcontinental lines have conferred in Chicago this week regarding the decision of the Interstate Commerce Commission in the Northwestern Lumber Rate cases. It has practically been decided to contest in the courts the decision in Western Oregon Lumber Manufacturers' Association et al. v. Southern Pacific et al., involving the rate on rough green lumber from the Willamette valley, Oregon, to San Francisco. It has not been decided whether the other cases will be appealed to the courts, but the Commission will be informed that it is physically impossible for the roads to get their tariffs ready in time to file them on August 15, in conformity with the decisions. The railroad officers do not understand the meaning of parts of the opinions in these cases, and they will probably ask that they be elucidated by the Commission. The question of seeking injunctions to restrain the Commission from enforcing its order is under consideration. Railroad traffic officers say that the Commission's decisions, if complied with, will change their entire scheme of rates in Northwestern territory.

INTERSTATE COMMERCE COMMISSION.

Extra Demurrage in New York City Justified.

New York Hay Exchange Association v. Pennsylvania Railroad and others. Opinion by Commissioner Prouty.

In this case the railroads assess "storage" charges in addition to the regular demurrage of \$1 a day on carload freight delivered in Greater New York; the Commission sustains the principle but declares some of the rates too high. In the head notes of the decision the Commission says:

1. Defendants assess track storage charges, in addition to demurrage charges, at their various yards in Greater New York against all commodities except coal and coke, after the car has been placed for unloading, for the first two days, nothing; for the third day, \$1; for the fourth day, \$2; for the fifth day, \$3; for the sixth day, \$4; for the seventh day and each succeeding day, \$5. Upon complaint that such charges are unlawful: *Held*, That the present track storage charges are excessive, but that defendants may properly impose a track storage charge, in addition to demurrage charges, of \$1 per day for the third and fourth days after the car has been placed for unloading and \$2 per day for the fifth and all subsequent days.

2. The contention that these charges result in undue discrimination against Greater New York is not sustained. The imposition of these storage charges within certain limits are reasonable in Greater New York, and the simple fact that they

are not imposed elsewhere furnishes no good reason why they may not be imposed there.

3. Demurrage charges and charges of a kindred nature are imposed as compensation to a carrier for an additional service. The rate of freight does not include the storage of the property after a reasonable opportunity has been afforded the consignee to receive it.

Some details of this case will be found on another page.

Crop Conditions.

The condition on July 1 (or at harvest time), with comparisons, of certain crops investigated by the Bureau of Statistics of the Department of Agriculture is as follows:

Crops.	Acreage compared with 1907.	July 1, 1908.	June 1, 1908.	July 1, 1907.	10-year average.
Winter wheat	105.8	80.6	86.0	78.3	80.2
Spring wheat	103.7	89.4	95.0	87.2	87.6
Total wheat	105.0	83.0	89.4	81.6	82.9
Corn	101.1	82.8	....	80.2	85.6
Oats	99.4	85.7	92.9	81.0	87.5
Barley	103.9	86.2	89.7	84.4	88.3
Rye .....	....	91.2	91.3	89.7	90.1
Potatoes	102.4	89.6	....	90.2	91.6
Tobacco	93.0	86.6	....	81.3	86.0
Flax	92.8	92.5	....	91.2	90.0
Rice	104.5	92.9	....	88.7	....
Hay (all tame) .....	....	92.6	96.8	....	....
Timothy .....	....	90.2	....	82.2	86.0
Clover	96.4	95.5	96.7	76.4	84.0
Alfalfa .....	....	86.1	88.9	88.5	....
Pastures .....	....	94.6	97.7	88.9	91.9
Apples .....	....	57.6	66.0	44.0	62.3
Peaches .....	....	69.7	73.0	35.7	57.9
Pears .....	....	69.7	70.9	....	....
Grapes .....	....	87.9	....	84.0	87.1
Watermelons .....	....	81.4	81.1	79.0	....
Cantaloupes .....	....	82.7	81.9	72.7	....
Blackberries .....	....	90.5	94.0	87.8	....
Raspberries .....	....	88.4	91.9	85.8	....
Cabbages .....	....	88.3	90.4	88.9	....
Onions .....	....	90.3	92.1	89.6	....
Tomatoes .....	....	89.4	....	81.5	....
Sweet potatoes	100.3	89.8	....	86.0	....
Beans .....	....	90.0	....	86.8	....
Sorghum .....	....	87.7	....	85.0	....
Sugar cane .....	....	91.7	91.3	92.8	....
Sugar beets .....	....	86.9	86.2	91.2	....
Hops .....	....	83.8	....	89.6	....
Hemp .....	....	80.4	86.0	89.1	....
Broom corn .....	....	79.8	....	84.2	....
Peanuts .....	....	88.2	....	84.2	....
Wool, lbs., per fleece .....	....	6.6	....	6.7	6.3
Oranges .....	....	91.4	....	84.0	....
Lemons .....	....	92.9	....	89.7	....

Uniform Classification Committee.

The "working committee" which is to undertake the task of unifying all the freight classification of the country has finally been made up as follows:

Trunk Line Association.—Frank W. Smith, Assistant General Freight and Passenger Agent, New York, Ontario & Western.

New England Lines.—F. S. Holbrook, General Freight Agent, New York, New Haven & Hartford.

Central Freight Association.—Hudson Fitch, General Freight Agent, Toledo & Ohio Central.

Western Trunk Line Committee.—Elmer H. Wood, General Freight Agent, Union Pacific; W. B. Hamlin, General Freight Agent, Burlington lines west of the Missouri river, and Robert C. Fyfe, late Assistant General Freight Agent of the St. Louis Southwestern.

Southwestern Lines.—W. R. Poe, Chairman of Classification Committee; D. W. Longstreet, General Agent, Illinois Central at Memphis, Tenn., and G. R. Browder, Assistant Freight Traffic Manager, Southern Railway at Atlanta, Ga.

The committee will work under another committee composed of executive officers as already announced.

C. C. McCain, for the eastern trunk lines, has called a conference of the executive and the working committees, to be held in New York on a day to be fixed, probably in the week beginning August 2.

An Old-Time Ticket.


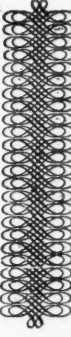

One of the various translations of the records and relics of the Norwich & Worcester has brought to light a lot of tickets of the issue shown in the accompanying reproduction. The antiquity of the form is indicated plainly enough by the "184" of the unfilled date—a period of 60 to 65 years ago.

The Norwich & Worcester, organized in 1836 as a consolidation of the Boston, Norwich & New London and the Worcester & Norwich, maintained an independent existence until 1869, when it was absorbed by the Boston, Hartford & Erie (later the New York & New England), to become in due course, about 30 years later, a part of the present greater New England system, the New York, New Haven & Hartford. The line connecting Worcester and Norwich ranks with the oldest railroads, the road from New London to Worcester having been completed in 1840, while the Boston & Worcester, the Boston & Providence and the Boston & Lowell were opened in 1835. Natives of the Bay and the Nutmeg states still re-

the A B C of his business. Let us recapitulate and see concisely what things have been mentioned as desirable characteristics.

1. A personal acquaintance with the representatives of the operating department, and the encouragement of a mutual spirit of co-operation.
2. As wide an acquaintance as possible with all sorts and conditions of men.
3. An accommodating spirit.
4. A study of the character and traits of those from whom freight is solicited and the ability to approach them with tact.
5. A cheerful disposition.
6. A vigilant watch upon competitors and general alertness.
7. A knowledge of the real value of the tonnage secured together with discrimination in the solicitation of business.
8. A closer contact with the passenger department.
9. The value of statistics and intelligent analyses of traffic conditions.

Perhaps you may not be able to do all of these things, some

 One Seat to Class Cars. Date, _____ 184		NORWICH AND WORCESTER RAILROAD. Central Village to <i>This Ticket entitles the holder to one Seat in the</i> <div style="display: flex; justify-content: space-between;"> class Cars. 184 </div> <p style="font-size: small;">N. B. All Baggage at the risk of the Owners.</p> <div style="display: flex; justify-content: space-between;">  Way Agent. </div>
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Norwich & Worcester Railroad Ticket, Fifty Years Old.

call the time when Ross Winans engines on the Norwich & Worcester pulled diminutive cars over the hills and dales of Worcester and Windham counties.

The resemblance in principle between this ancient ticket form, with its blanks to be filled by the selling agent with pen and ink, and the forms of present-day tickets much in use in sparsely settled regions, will be observed. Having learned wisdom by experience, however, carriers by rail no longer guarantee "one seat" to every bearer of a coach ticket. Equally noteworthy is the disappearance of the limitation, "All baggage at the risk of the owners." That early evasion of responsibility hardly could be maintained, but it is unfortunate from some points of view, and inequitable, that the free carriage of baggage, except hand parcels, ever became established.

The Ideal Freight Agent.

While a wide acquaintance within your own official family and your own company is desirable, much more so is a wide, personal acquaintance with what we may call the trade. Never lose an opportunity to meet a man. It makes no difference whether he is a preacher or a chicken thief. The preacher may some day want to ship his household goods to California and the chicken thief may have a consignment of pullets to the nearest produce yard. The wide-awake commercial traveler usually knows every one worth knowing in every town that he visits. He never loses an opportunity to make an acquaintance. The same thing applies to the transportation salesman. You never can tell when the man you have just met may want to ship something somewhere, and if ever he does, you want it to move your way.

Perhaps you will conclude that the bill of specifications which I have drawn up for the freight solicitor is altogether too severe and that no man can become proficient in the various things I have mentioned, for in addition to all of this, he is, of course, expected to have a working knowledge of

of them will, doubtless, come to you more naturally than others, but no man can improve the quality of his work without, at least, making the attempt.—Henry W. Thornton.

Long Island Summer Traffic.

The Long Island cannot as yet definitely determine whether or not its passenger traffic has had time to be benefited by the subway extension. The company is inclined to think that the increase in business through Flatbush avenue station is due rather to diversion from Long Island City than to new traffic. The number of passengers carried on the third, fourth and fifth of July this year was 345,484, as against 287,908 for the same three days in 1907. The increase is partly due to the fact that the fourth came on Saturday this year and on Thursday in 1907; the weather conditions in 1908 were also extremely favorable. But this is partly offset, probably to the extent of 15,000 passengers, by the existence this year of the anti-race-track-gambling law.

In 1907, the company's commutation business amounted to 17.3 per cent. of the total year's passenger business.

A Junket Not Materialized.

The legislature of Georgia recently voted to go to Chattanooga, Tenn., to inspect the property of the Western & Atlantic Railroad, in that city, this road being the property of the state of Georgia; but later it was decided that the trip should not be made. This change may be briefly expressed by quotations from the press despatches:

Atlanta, June 26.—The members of the legislature will go in a body to Chattanooga next Friday; resolution adopted by both houses. Objection was made on the ground of expense, but it was replied that the railroad would furnish a free train. Is not that violating the order of the State Railroad Commission?—No! Is not the legislature superior to the commission? But is it not an interstate trip, and thus contrary

to the Interstate Commerce law? No; Mr. A said that it was not. Resolution unanimously adopted.

Atlanta, June 27.—Much discussion has been caused all over the state by the decision of the legislature to make a junketing trip to Chattanooga on the Fourth of July.

Atlanta, June 29.—The legislature will not visit Chattanooga. The Senate has reconsidered its action. . . . The resolution was defeated by a close vote.

The Peach Traffic.

The Pennsylvania expects within a few days to begin moving peaches from the Delaware-Maryland peninsula. The officers of the road estimate the Delaware output for this season at 1,779,030 baskets. It is estimated that Georgia has produced this year 1,000,000 bushels more than in 1907. About 4,000 carloads have already been sent to market. Peaches are moving from Fort Valley, Ga., to New York City in 48 hours. The railroads are now seeking to secure greater distribution of the crops. Through relations largely cultivated by traffic officers of railroads, the shippers are finding it worth while to ship to interior points such as Utica, Providence, Elmira, Albany, Williamsport, Trenton, Harrisburg, etc., instead of pouring the whole output into New York, Philadelphia or Boston, with the attendant possibility of glutting the market.

The peach crop from the Delaware peninsula last year amounted to only 186 cars, but this year it will require 3,500 cars. The Pennsylvania is planning to send to the peninsula during the next six weeks a large number of refrigerator and ventilator cars.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The International & Great Northern, as reported in the *Railroad Age Gazette* of July 3, has ordered 10 simple 10-wheel (4-6-0) locomotives from the American Locomotive Co., for September delivery.

General Dimensions.

Type of locomotive	10-wheel
Diameter of drivers	62 in.
Weight, total	168,700 lbs.
Weight on drivers	131,800 "
Cylinders	20 in. x 28 in.
Boiler, type	Wagon top
" working steam pressure	200 lbs.
" diameter	67 3/4 in.
Firebox, length	120 "
Firebox, width	41 "
Tubes, number	340
" diameter	2 in.
" length	13 ft. 6 in.
Heating surface, tubes	2,388 sq. ft.
" firebox	189 "
" total	2,577 "
Grate area	34 "
Tender, style	U-shaped
Water capacity	6,000 gals.
Coal capacity	12 tons

Special Equipment.

Boiler steel	Otis
Firebox steel	Otis
Tires	Standard
Springs	Railway Steel-Spring
Valves	Allen-Richardson
Injectors	Simplex
Couplers, tender	Tower
Couplers, on pilot	Gould
Brakes	Westinghouse
Tender brake-beams	Simplex
Tender truck	Barber archbar
Safety valves	Consolidated
Lubricators	Nathan
Metallic packing	Jerome
Steam gages	Crosby
Bell ringers	Western
Sanding devices	Walters
Blow-off valves	Johnstone
Brake-shoes	Streeter and Perfecto
Driving wheel centers	Cast steel

CAR BUILDING.

The Chicago & North-Western has ordered one dining car from the Pullman Co.

The Calumet & South Chicago Electric, Chicago, has ordered one car from the Niles Car & Manufacturing Co.

The Boston & Maine is said to have ordered 20 coaches from the Laconia Car Co. This item is not yet confirmed.

The George A. Hormel Co., Austin, Minn., has ordered eight refrigerator cars from the American Car & Foundry Co.

The Buffalo, Rochester & Pittsburgh is asking prices on one baggage and mail car and two baggage and express cars.

The Marquette County Gas & Electric Co., Ishpeming, Mich., has ordered one electric car from the Niles Car & Manufacturing Co.

The San Antonio & Aransas Pass is said to be in the market for 500 box cars of 60,000 lbs. capacity. This item is not yet confirmed.

The Delaware, Lackawanna & Western, it is said, has ordered 26 coaches from the Laconia Car Co. This item is not confirmed.

The Royal Siamese State Railways are receiving bids for 50 box cars. Specifications and drawings may be obtained from the Siamese Legation in London.

The Honolulu Iron Works Co., Honolulu, Hawaiian Islands, has ordered from the Youngstown Car & Manufacturing Co., Youngstown, Ohio, 20 standard gage wooden flat cars of 80,000 lbs. capacity.

The Iowa Central, reported in the *Railroad Age Gazette* of July 3 as being in the market for 200 thirty-ton box cars and 250 forty-ton gondola cars, has ordered these cars from the American Car & Foundry Co.

The Panama Railroad, F. C. Norásiek, Assistant Purchasing Agent, 24 State street, New York, is asking bids up to August 3 on 100 wooden, 5-ft. gage, convertible ballast cars of 80,000 lbs. capacity. They will be about 38 ft. long and 9 ft. wide, over all.

The Northern Pacific, which was reported in the *Railroad Age Gazette* of June 26 as being in the market for 29 passenger cars of different types, has placed the order with the Pullman Co. These cars are for use on the Spokane, Portland & Seattle, which is under construction. It is said that the Northern Pacific is now in the market for 30 additional passenger cars for use on its main lines, but this is not confirmed.

The Western Heater Despatch (Starks Heater Car Co.), Chicago, was reported in our issue of last week as having ordered 100 potato cars from the Haskell & Barker Co. This should have read "200 refrigerator cars." These cars are of 60,000 lbs. capacity, weighing 40,000 lbs. Length inside will be 36 ft. and width inside 8 ft. The bodies and underframes are to be of wood with steel bolsters. All the specialties, except the couplers, which have not yet been decided on, will be furnished by the builders. These cars are for delivery on September 1.

The International & Great Northern, as reported in the *Railroad Age Gazette* of July 3, has ordered 500 all-wood box cars of 60,000 lbs. capacity from the American Car & Foundry Co., for September delivery. The cars will be 36 ft. 1/2 in. long, inside, and 36 ft. 10 in. long, over all. The width will be 8 ft. 6 1/8 in. inside measurements, and 9 ft. 3/4 in. over all. The height, inside, will be 8 ft.

Special Equipment.

Axles	Open-hearth steel
Bolsters	Steel I-beams
Brake-beams	Simplex
Brake-shoes	Gray iron
Brakes	Westinghouse
Couplers	Tower
Doors and door fasteners	St. Louis
Draft rigging	Malleable iron
Dust guards	Harrison
Journal bearings	Eureka
Journal boxes	McCord
Roofs	Murphy outside
Springs	Railway Steel-Spring
Trucks	Archbar
Wheels	Am. Car & Foundry, cast-iron

IRON AND STEEL.

The Chicago, Milwaukee & St. Paul is asking prices on 650 tons of steel for bridge construction.

The Western Electric Co., Chicago, reported in the *Railroad Age Gazette* of July 10 as asking prices on structural steel for building an addition to its plant at Hawthorne, has ordered 1,225 tons from Richards & Noelke, Indianapolis, Ind.

RAILROAD STRUCTURES.

ALTUS, OKLA.—A contract, it is said, has been given by the Altus, Roswell & El Paso for putting up a 1,700-ft. bridge over the Salt Fork of Red river, between Altus and Duke. See this company under Railroad Construction.

BOYD, WIS.—The Wisconsin Central is putting up a combined freight and passenger station. The building is to be of brick, 16 ft. x 64 ft.

CHICAGO, ILL.—The Chicago & North-Western is asking bids on 750 tons of structural steel to be used in connection with its new terminal buildings.

ELGIN, ILL.—The Aurora, Elgin & Chicago (electric) has awarded the contract to E. L. Palm, Elgin, Ill., for a one-story sub-station to cost \$20,000. The structure will have ground dimensions of 43 ft. x 85 ft., will be 30 ft. high, and will be entirely of reinforced concrete, including roof.

EVERETT, WASH.—According to a statement credited to President Hill, of the Great Northern, the new passenger station which has been contemplated for some time will be built this year. The old plans are to be redrawn and the contract for the building awarded this summer.

GALVESTON, TEX.—The Galveston, Harrisburg & San Antonio and the Gulf, Colorado & Santa Fe have, it is said, notified the board of county commissioners of Galveston county that they are ready to enter into a preliminary contract with the county to build a causeway across Galveston bay to connect the island and the mainland. The structure will be about two miles long, built of concrete.

HOBOKEN, N. J.—Plans are under way and work, it is said, is to be started within two months on a terminal building for the Public Service Railway. The design is said to be like that of the Delaware, Lackawanna & Western terminal; it will be of concrete, steel, copper and glass. It is to be three stories high, 360 ft. long, with a width of 140 ft. at one end and 60 ft. at the other. The first story will be open and on the second story the waiting-room only will be enclosed, so arranged that passengers from ferries, tunnels, surface and elevated lines can enter the waiting room without going into the open. The present elevated railroad is to be changed to carry cars to the third story of the terminal. The estimated cost of the improvements is \$500,000.

JOPLIN, MO.—All of the stock of the recently organized Joplin Union Depot Co., except the shares for directors' qualifications, is held equally by the Atchison, Topeka & Santa Fe and the Missouri & North Arkansas. The depot company was formed to build a union passenger station for these two roads and for such other Joplin lines as later may want to use the station. The necessary property has been secured. Plans are now being developed jointly by the two companies, but are not yet sufficiently advanced to ask for proposals for the work. The first board of directors includes W. D. Jansen, Robert Dunlop, of Chicago; T. R. Morrow, of Kansas City, Mo.; Charles Gilbert and W. S. Dawley, of St. Louis, Mo.

OTTAWA, ONT.—Tenders for the new station and hotel to be built by the Grand Trunk will be called for in a few weeks. Excavation is under way and both buildings will be built simultaneously. The work will be under the direction of C. M. Hays, Second Vice-President and General Manager, and H. G. Kelley, Chief Engineer. (R. R. G., Aug. 27, 1907, p. 215.)

PITTSBURGH, PA.—It has been announced that the Wabash-Pittsburgh Terminal and the West Side Belt will withdraw their shops from Norwalk, Ohio, where shop facilities were shared with the Wheeling & Lake Erie. Under the terms of the receiverships these roads hereafter must be operated independently. New shops will be built immediately at Rook Station, near Pittsburgh, giving employment to about 700 men.

RATHDRUM, IDAHO.—It is said that the Idaho & Washington Northern will build a large freight depot.

SALINA, KAN.—The Chicago, Rock Island & Pacific will begin the erection of a new depot at this point in the early fall.

SALT LAKE CITY, UTAH.—The Denver & Rio Grande is revising the plans for the superstructure of the passenger station

to be built at this point. The new plans call for a two-story building 105 ft. x 340 ft., 75 ft. high, of fireproof steel and concrete construction. The cost will be, including platform and subways, \$600,000. The exterior will be of pressed brick and stone with metal roof, and the interior finish will be largely marble and mosaic work. Henry J. Schlacks, 99 Randolph street, Chicago, is the architect.

SANDPOINT, IDAHO.—The Northern Pacific is said to be building a 20-stall roundhouse, to cost \$30,000.

SWISSVALE, PA.—Bids have been received for the proposed new passenger station to be built by the Pennsylvania. The contract, it is expected, will be let this month. The engineering department has arranged for the elimination of the Brad-dock avenue grade, at an approximate cost of \$175,000. (R. R. G., Nov. 8, 1907, p. 517.)

TACOMA, WASH.—The Northern Pacific has prepared plans for a new passenger station to have ground dimensions of 123 ft. x 202 ft., with a floor area of 49,291 sq. ft. It will be three stories high, surmounted by a 30-ft. dome. The structural material will be of steel and concrete with a facing of brick and marble interior finish. The estimated cost is \$400,000, and the additional cost for terminals will be \$8,000,000. Work will begin as soon as the necessary site and streets can be procured.

WINNIPEG, MAN.—W. Whyte, Second Vice-President of the Canadian Pacific, announced on July 9 that it was the intention of his company to soon build large joint stock-yards in conjunction with the Canadian Northern and Grand Trunk Pacific.

WINONA, WASH.—The Oregon Railroad & Navigation is erecting a modern depot to replace the one burned last fall. It will be a frame structure, 104 ft. x 24 ft., two stories high, and will contain offices, waiting rooms, freight rooms and a living apartment of four rooms on the second floor.

SUPPLY TRADE NOTES.

The Hurley Tracklaying Machine Co., Chicago, has leased one of its machines to the Erie Railroad to lay about 80 miles of track in New York state. The work was expected to begin last week.

The American Car & Foundry Co., New York, is having plans prepared for new buildings to be erected in connection with its St. Louis, Mo., plant, including new wheel and other foundries.

Architect's plans, it is said, are about finished by H. C. Stone, Montreal, Que., for the shops to be built at Lachine, Que., for the Imperial Locomotive & Machine Co. It is expected that bids for the work will be asked this month.

The L. S. Starrett Co., Athol, Mass., has opened a warehouse at 36 and 37 Upper Thames street, London, E. C., Eng., where it will carry its mechanical tools, hack saws, steel tapes, etc., in stock. The London branch will be in charge of E. P. Barrus.

The Ridgway Dynamo & Engine Co., Ridgway, Pa., has arranged to have the Machinery Sales Agency, 1021 Prudential building, Atlanta, Ga., handle a complete line of the Ridgway company's side and center-crank engines and direct current electrical machinery.

The Buffalo Railway Wrench Co., Buffalo, N. Y., has been incorporated with \$50,000 capital stock to make wrenches, tools, machines, etc. The incorporators are: Edward F. Walsh, 444 Porter avenue; Lucian C. Jackson, 234 West Fourteenth street, and Charles B. Moulthrop, 15 Mariner street, all of Buffalo.

The Clark Car Co. has been incorporated and opened offices in the Frick building, Pittsburgh, Pa. The company will build street, box and dump cars and motor trucks. The officers are: Charles H. Clark, President, formerly Chief Engineer of the Tennessee Coal, Iron & Railway Co.; George E. Slater, Secretary, and Justin R. Swift, Treasurer.

The following officers of the Crocker-Wheeler Co., Ampere, N. J., were elected July 10: President, S. S. Wheeler; Vice-

President, Gano Dunn; Second Vice-President, A. L. Doremus; Chief Engineer, Gano Dunn; Secretary, Rodman Gilder; Treasurer, W. L. Brownell; Assistant Secretary, J. B. Milliken; Assistant Treasurer, G. W. Bower.

The C. F. Massey Co., 59 Clark street, Chicago, manufacturer of the Massey battery well, has bought the plant and equipment of the E. J. Winslow Co., 7380 South Chicago avenue. This factory will be used for the manufacture of a new waterproofing as well as providing larger facilities for building the Massey waterproof steel-concrete composition battery well.

The Blue Island Car & Equipment Co., Chicago, has leased about 18 acres of land from the Kansas City Belt Railway, Kansas City, Mo., on which shops for repairing and rebuilding railroad equipment will be erected. The company which will operate the new shops will be known as the Sheffield Car & Equipment Co. About 350 men will be employed at first.

The Allis-Chalmers Co., Milwaukee, Wis., has an order from M. Straus & Sons, Newark, N. J., for all the machinery necessary to equip the power house recently built by that firm. The equipment consists of a Corliss Engine direct connected to a 150-k.w. generator, supplying current at a terminal pressure of 240 volts. The exciter is a 13-k.w. machine. There are 30 induction motors of Allis-Chalmers standard "AN" type, 220 volts, 3-phase.

Charles H. Spotts, formerly Manager of the Paint Department of the Joseph Dixon Crucible Co., Jersey City, N. J., has organized the Flake Graphite Products Co., 30 Church street, New York, and will put on the market a crystalline or flake graphite paint stock for paint manufacturers. Additional grades of graphite will be supplied for lubricating and for graphite greases, pipe joint compound and other standard graphite products.

TRADE PUBLICATIONS.

Valves.—A letterhead leaflet of the Golden-Anderson Valve Specialty Co., Pittsburgh, Pa., contains illustrations and descriptions of cushioned standpipes, float valves and controlling altitude valves.

Anti-Friction Metal.—A catalogue of the Glacier Metal Co., Richmond, Va., is descriptive of this anti-friction metal used for journal bearings in railroad, street railway and steamship work. The pamphlet also contains particulars of a number of friction and crushing tests of this metal.

Belt Cutting.—The Landis Machine Co., Inc., Waynesboro, Pa., has issued an illustrated catalogue of bolt, pipe and nipple threading, nut tapping machinery and special threading machines. Special attention is called to the Landis die, which is used in these machines. Illustrations and descriptions of single, double and triple bolt cutting machines for either belt or motor drive are given.

Mallet Locomotives.—Record 65 of the Baldwin Locomotive Works, Philadelphia, Pa., contains a paper which Grafton Greenough read before the Engineers' Club at Philadelphia March 21, 1908, on Mallet articulated compound locomotives. The publication also includes the remarks of S. M. Vauclain, tracing the evolution of locomotives from the early types up to the present Mallet engine.

Springs and Journal Boxes.—The Union Spring & Manufacturing Co., Pittsburgh, Pa., has issued a revised edition of its catalogue describing its full line of coil and elliptic springs for cars and locomotives; also spring plates, journal box lids and the new Kensington all-steel journal box. This journal box was described and illustrated in the *Railroad Age Gazette*, Daily Edition, June 20, 1908, p. 252.

Cement.—The Universal Portland Cement Co., Chicago, has just issued monthly bulletin No. 50, which contains several interesting illustrations and descriptions of work where Portland cement has been used, particularly in the case of the concrete bottom of the steamship Roman, of the Pittsburgh Steamship Company, and reconstructing the tracks of the Chicago City Railways. The pamphlet also contains an announcement regarding the second annual cement show, which

is to be held in Chicago at the Coliseum during the coming winter.

Denver & Rio Grande.—A folder shows nine panoramic views, in colors, along the line of the Denver & Rio Grande together with a short description of the sights and scenes in the Rocky Mountain region. An attractive illustrated pamphlet containing a concise description of the vast area of farming and grazing lands, together with full information as to the present day opportunities in fruit growing, market gardening, stock raising, sugar beets and general farming, compiled by Clarence A. Lyman, is also being distributed by the passenger department.

Golden Gate Route.—This is the name of an attractive and rather unusual folder issued by the San Francisco, Idaho & Montana, to set forth the advantages of the town of Caldwell, Idaho. This railroad is now under construction from Caldwell to Winnemucca, Nev. The folder is about 14 in. by 4 1/4 in., printed on heavy glazed paper and illustrated with photographs of buildings and offices in Caldwell. The last page contains a facsimile of a \$50 ticket from New York to Caldwell, Idaho, such a ticket being offered by the San Francisco, Idaho & Montana to anyone coming to Caldwell and buying town lots costing \$150 or more.

Washburn 6-yd. Dump Car.

The 6-yd. dump car shown in the accompanying illustration was designed by Edwin C. Washburn, Minneapolis, Minn. It is simply and strongly made, steel castings and structural shapes being used throughout. It tips to an angle of 47 deg.



Washburn 6-yd. Dump Car.

and swings the doors, giving a free passage to dump the load. The car is equipped with M. C. B. couplers and draft gear, and with either air or hand-brakes. The inside journal boxes are away from the dirt of the discharging load, and are designed to be dust proof. Mr. Washburn, who was formerly General Manager of the Washburn Steel Castings & Coupler Co., Minneapolis, Minn., is now giving his time to some new specialties, including this car, which he is preparing to put on the market.

Sale of the Schoen Steel Wheel Plant.

As announced last week, the Carnegie Steel Co., Pittsburgh, Pa., has bought the property of the Schoen Steel Wheel Co., Philadelphia, Pa., whose plant is at McKees Rocks, Pa. Negotiations had been under way for some time. Charles T. Schoen, who established the plant and was its sole owner, has retired from active work. He will, however, continue with the steel corporation in an advisory capacity as regards the wheel plant.

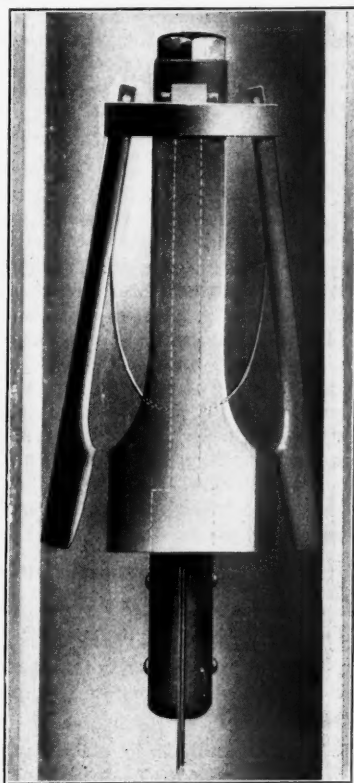
The transfer involves the plant at McKees Rocks, which

has been running about three years and has a capacity of 800 wheels a day, some 21 acres of ground adjoining the plant of the Pressed Steel Car Co., of Pittsburgh, Pa., and a steel plant about half completed. Some time ago Mr. Schoen decided to erect a steel plant to furnish the steel needed in the wheel plant. Whether this will be completed or whether the Steel Corporation will dismantle it and use the steel manufactured elsewhere is not yet decided.

Clark Boiler Flue Cleaner.

The Fred Clark Boiler Cleaning Co., New York, has recently gotten out the new flue cleaner illustrated herewith. It is claimed that this tool is free from the objections usually raised against methods of cleaning tubes by scraping and brushing or by using steam or compressed air. Although originally intended for use in upright stationary boilers the device has been adapted to locomotive use.

The illustration shows the head of the tool in position in a section of an upright boiler tube. This head is riveted to a double steel tape, which passes through a hollow rod to a sliding head, held by the operator, outside the fire door. With this flexible tape, the tool head can be operated at right angles to the boiler tube; at the same time, it is sufficiently rigid to force the blades upward. These blades, four in number, are made of tool steel, with cutting edges ground, to conform to the shape of the tube; their action is similar to that of the blade of an ordinary wood plane. They are fastened to the holder by a socket and pin connection, and held in position against the inner surface of the tube by suitable springs.



Clark Flue Cleaner.

When using this tube cleaner in an upright tube, the head is inserted at the bottom; the springs allow the blades to yield, permitting the tool to be forced to the top of the tube very easily. When the cleaner is pulled back, the springs force the blades outward and, as the head moves downward, the blades plane the accumulation from the inside of the tube. A repetition of the operation, after turning the head a part of a revolution, will remove the scale left between the blades in the first operation.

In adapting this tool to locomotive or horizontal boiler tube use, the steel tape is replaced by a chain of long eye-bar links of $\frac{1}{2}$ -in. rod. This is attached to the opposite end of the tool, and the cleaning in this case is done by pushing the blades against the scale instead of pulling. A conical guide, placed near the head, guides the tool back into the tube after it has been pushed entirely through.

Electrical Operation of Swedish State Railroads.

The trials made in operating electrically the lines from Stockholm to Järfra and Timteboda to Värtan, Sweden, have been virtually concluded, with very satisfactory results. As they are of general technical interest, the administration of the state railroads intends to publish an illustrated report with full details. On these trials is to be based the electrification of the entire state railroad system of Sweden, extending

from Bollnäs, 200 miles north of Stockholm, to the southern coast. The state has already acquired several of the waterfalls that are to be used in connection with power stations. According to the estimates of Mr. Dahlander, Chief Engineer of the electrotechnical bureau of the state railroads, the total length of track that will be affected is 1,400 miles. The conductors for the power stations are to be designed for 50,000 volts, the contact conductors for 15,000 volts. Approximately 37 transformer stations about 30 miles apart are to be used. The total cost for conductors, transformer stations, etc., will amount to \$9,515,000, and for power stations to \$6,460,000, with a total, allowing for sundries, of \$16,400,000. Using the results of operating the steam railroads during 1905 as a basis, the total operating cost with electricity is placed at \$1,578,000, as compared with \$1,700,000 with steam, a difference of \$122,000 in favor of electricity. With an increase of 60 per cent. in the traffic, a condition that would probably obtain in 1920, the saving effected by electrical operation would be increased to \$399,000. With an advance in the price of coal the results would be still more favorable.

The International Railroad Master Blacksmiths' Association.

The sixteenth annual convention of this association will be held at the Grand Hotel, Cincinnati, Ohio, on August 18, 19 and 20. The following subjects will be discussed: "Flue Welding," George Lindsay, Chairman; "Tools and Formers for Bulldozers and Steam Hammers," G. M. Stewart, Chairman; "Case Hardening," W. V. Laizure, Chairman; "High Speed Steel, and the Results Obtained," J. S. Sullivan, Chairman; "Piece Work," T. J. McCann, Chairman; "Frogs and Crossings," T. F. Keane, Chairman.

McKeen Motor Car Company.

W. R. McKeen, Jr., who has resigned as Superintendent of Motive Power and Machinery of the Union Pacific, a position he had held since June, 1902, has taken this step in order to devote his entire time to the McKeen Motor Car Co., which will be organized by E. H. Harriman, Mr. McKeen and others, to build gasoline motor cars such as have been in successful operation on the Union Pacific for over three years. It was decided that this business could not be handled by the regular shop organization of the Union Pacific.

The Union Pacific has just completed at Omaha a \$1,000,000 car shop, and the motor cars will be built in the old car shops of the railroad for the present. The plans for the new motor car company are almost perfected, but it has not been definitely decided whether the plant will be located in Omaha or elsewhere. Inquiries and demands for the cars have come not only from all parts of the United States, but also from foreign countries.

The Union Pacific at present has 41 of the cars either completed or under construction, and they have proved serviceable on branch and suburban lines. They have become very popular with persons living in the sections of the country where they are used. The 200-h.p. Union Pacific cars now turned out are all modeled after motor car No. 8, which has been in regular daily service for 22 months between Beatrice, Neb., and Lincoln. They have a steel frame, side entrance, dust-proof, air-proof and water-proof round windows, a wedge-shaped front end, giving low air resistance, the whole making a hygienic and well ventilated car.

The position of Superintendent of Motive Power and Machinery of the Union Pacific will be filled by C. E. Fuller, lately of the Chicago & Alton.

Mr. McKeen was educated at Rose Polytechnic Institute, Johns Hopkins University and the University of Berlin. He entered railroad service in 1891 as special apprentice of the Pittsburgh, Cincinnati, Chicago & St. Louis at Columbus, Ohio. He was consecutively Master Car Builder, General Foreman Locomotive and Car Shops and General Foreman of all shops of the Terre Haute & Indianapolis at Indianapolis, Ind. From December, 1898, to May, 1901, he was District Foreman of the Union Pacific at North Platte, Neb., and from the latter date until June, 1902, he was Master Mechanic of that road at Cheyenne, Wyo. He then became Superintendent of Motive Power and Machinery at Omaha, Neb.

Railroad Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

J. A. McLeay has been elected President of the Charlotte, Monroe & Columbia, with office at McBee, S. C.

B. A. Dousman has been appointed Assistant General Auditor of the Chicago, Milwaukee & St. Paul, with headquarters at Chicago.

A. J. Davidson, President of the St. Louis & San Francisco, has been elected also President of the Beaumont, Sour Lake & Western, succeeding R. C. Duff, who resigned two months ago.

Percy Cowans and J. D. Hayden have been elected Directors of the Cumberland Railway & Coal Company, of Toronto, Ont., succeeding Sir George Drummond and E. S. Clouston, resigned. Huntley Drummond has been elected President, succeeding Sir George Drummond.

Henry Miller, Vice-President of the Missouri & Illinois Bridge & Belt, has been elected President, succeeding A. J. Davidson. B. McKeen succeeds Mr. Miller. W. F. Bender has been appointed Secretary, succeeding G. L. Ball. The headquarters of all are at St. Louis, Mo.

The Southern Railway having completed payment for the property of the Virginia & South-Western, W. W. Finley has been made President of the latter company, succeeding H. K. McHarg. Other Southern Railway officers have had their authority extended over the Virginia & South-Western as follows: Fairfax Harrison, Vice-President; H. C. Ansley, Treasurer; R. D. Lankford, Secretary. W. H. Oliver, Secretary and Treasurer of the Virginia & South-Western, has been appointed Assistant Treasurer. F. S. Wynn has been appointed Assistant Secretary.

Operating Officers.

Loran A. Kerr has been appointed Superintendent of the Charlotte, Monroe & Columbia, with office at McBee, S. C.

M. A. Murphy, Superintendent of the Duluth, Rainy Lake & Winnipeg, has been appointed General Manager, with office at Virginia, Minn.

The office of John McGie, Superintendent of the Panhandle division of the Chicago, Rock Island & Pacific, has been moved from Geary, Okla., to El Reno.

J. A. McDougall has been appointed Superintendent of Terminals of the St. Louis, Iron Mountain & Southern at Little Rock, Ark., succeeding J. A. Linton, resigned.

F. N. Finch has been appointed Acting Superintendent of dining cars of the Northern Pacific, with office at St. Paul, Minn., succeeding to the duties of F. J. Tourtelot.

William Monay has been appointed Superintendent of the Bonanza District of the Missouri & Louisiana, with office at Bonanza, Ariz., succeeding W. Z. Davies, resigned.

J. M. Warner, Acting General Manager of the Chicago & Western Indiana and the Belt Railway of Chicago, has been appointed General Manager, with office at Chicago.

John Vollman has been appointed Superintendent of Dining Cars of the Mobile & Ohio, with headquarters at Jackson, Tenn., succeeding H. J. Titus, resigned to go to another company.

J. T. Arundel, Superintendent of the Canadian Pacific at Vancouver, B. C., has been appointed Acting General Superintendent of the Central division, during the absence of R. R. Jamieson on sick leave. D. C. Coleman, Superintendent at Nelson, B. C., is performing Mr. Arundel's duties.

J. O. Halliday has been appointed Master of Transportation of the New York, New Haven & Hartford, with office at New Haven, Conn., in charge of the distribution of motive power and rolling stock to divisions, the loading and movement of freight traffic, the making up of all train schedules between divisions and all car service matters.

A. F. Reiner, Assistant Superintendent of the Northern Wis-

consin division of the Chicago & North-Western, has been appointed Superintendent of the Northern Wisconsin division, with office at North Fond du Lac, Wis., succeeding W. H. Whalen, resigned. F. D. Pendell, Train Master at Fond du Lac, succeeds Mr. Reiner, with office at North Fond du Lac. A. W. Tawseley has been appointed Assistant Superintendent of the Wisconsin division, with headquarters at Milwaukee, Wis.

L. S. Bourne, after serving for only a few weeks as Superintendent of Terminals of the Mexican Central at El Paso, Tex., has been appointed Superintendent at Gomez Palacio, Dur., Mex. Mr. Bourne was born in Richmond, Va., in 1876. After a high school education, he began railroad work in 1892 on the Kansas City, Wyandotte and Northwestern, now part of the Missouri Pacific, as agent and operator. The next year he went to the Chicago Great Western as operator at Oelwein, Iowa. By 1897 he had become train despatcher at Dubuque, Iowa. In August, 1901, he was appointed Chief Train Despatcher at Fort Dodge, Iowa. Four years later he was promoted to Train Master of the Fort Dodge division. On June 1, 1908, he went to the Mexican Central as Superintendent of Terminals at El Paso, Tex., and on June 20 was appointed to his present position.

Reuben W. Willis, car distributor of the Indiana Harbor Belt, and not R. W. Willis, District Engineer of the Chicago, Burlington & Quincy, as was stated in these columns recently, was appointed Superintendent of Car Service of the Indiana Harbor Belt. Reuben W. Willis was born in Sedalia, Mo., in 1874, and, after a high school education in Chicago, began railroad work in 1891 in the general offices of the Chicago, Burlington & Quincy. He remained with the Burlington 12 years, being at different times in the freight claim department, the General Freight Agent's office and the office of the Superintendent of Transportation. He then became traveling railroad agent for Nelson Morris & Co., packers, and later Traveling Car Agent of the Chicago & Alton. In 1907 he was made car distributor of the Indiana Harbor Belt, which position he held until his recent appointment as Superintendent of Car Service.

Traffic Officers.

J. L. Kenealy has been appointed Traveling Freight Agent of the Buffalo & Susquehanna at Wellsville, N. Y.

J. B. Kent has been appointed Contracting Agent of the El Paso & Southwestern at San Francisco, Cal., succeeding George R. Ruple, resigned.

T. L. Beckwith has been appointed Traveling Freight Agent of the Florida East Coast, at Jacksonville, Fla., succeeding T. H. Parrott, resigned.

T. A. Wray has been appointed Assistant General Freight Agent of the St. Louis & San Francisco at St. Louis, Mo., succeeding J. F. Mace, resigned.

George W. McCaskey, city passenger and ticket agent of the Northern Pacific at St. Paul, Minn., has been appointed General Agent at Los Angeles, Cal.

S. L. Rogers has been appointed General Agent of the Chicago & Eastern Illinois, the Evansville & Terre Haute, and the Evansville & Indianapolis, at Nashville, Tenn.

T. J. Wall has been appointed Traveling Passenger Agent of the Canadian Pacific at St. Louis, Mo., succeeding W. S. Merchant, resigned to engage in other business.

W. B. Terhune, Central Western Agent of the Atlanta & West Point and of the Western Alabama at Cincinnati, Ohio, has been appointed Commercial Agent at Cincinnati.

E. H. Shaw, General Freight Agent of the Southern Railway at Charleston, S. C., has been appointed Assistant Freight Traffic Manager at Washington, D. C., succeeding J. B. Munson, resigned.

C. P. Jackson has been appointed Assistant General Freight Agent of the Mobile & Ohio, with office at Birmingham, Ala. E. B. Blair has been appointed General Agent at Meridian, Miss., succeeding F. J. Burke.

J. A. Jackson, Commercial Agent of the Mobile, Jackson & Kansas City at Memphis, Tenn., has been appointed Assistant

General Freight and Passenger Agent, with office at Mobile, Ala. His former office has been abolished.

O. M. Brown, chief clerk in the New York freight and passenger offices of the Chicago & North-Western, has been appointed General Agent at Philadelphia, Pa. Robert M. Golden, Traveling Agent at New York, succeeds Mr. Brown. J. G. Gray succeeds Mr. Golden.

C. A. Call, General Agent, Passenger Department, of the New York, New Haven & Hartford at New York, has been appointed General Agent, Passenger Department, at Boston, Mass., succeeding L. H. Palmer, retired. N. J. Lee, Traveling Passenger Agent at New Haven, Conn., succeeds Mr. Call.

H. Lawton, Freight Traffic Manager of the Mexican Central, will hereafter perform also the duties of General Freight Agent and the latter office has been abolished. T. R. Ryan, formerly General Freight Agent, has been appointed General Western Agent of both the Mexican Central and the National of Mexico. C. W. Carson, General Eastern Agent of the Mexican Central, now represents both that company and the National of Mexico, with office at New York.

Engineering and Rolling Stock Officers.

R. E. Fulmer has been appointed Master Mechanic of the Tremont & Gulf, with office at Eros, La.

A. C. Miller has been appointed Master Mechanic of the Texas Midland, with headquarters at Terrell, Tex.

The office of E. C. Burgess, Resident Engineer of the St. Louis, Brownsville & Mexico at Corpus Christi, Tex., has been moved to Kingsville, Tex.

A. O. Cunningham, Chief Engineer of the Wabash, has had his authority extended over the Missouri & Illinois Bridge & Belt, with office at St. Louis, Mo.

F. C. Pickard has been appointed Master Mechanic of the Mississippi Central and of the Natchez & Eastern, with office at Hattiesburg, Miss., succeeding W. J. Haynen.

C. M. Rasor, Chief Engineer of the Tonopah & Tidewater, has been appointed also Chief Engineer of the Bullfrog Goldfield Railroad, with headquarters at Portland, Ore.

J. H. Gimpel, Master Mechanic of the Vera Cruz & Pacific at Tierra Blanca, V. C., Mex., has been appointed Master Car Builder, with office at Tierra Blanca. R. Fitzsimmons succeeds Mr. Gimpel.

J. H. Broadbent, Assistant Signal Supervisor of the West Jersey & Seashore, has been appointed Assistant Supervisor of Signals of the Pennsylvania at Kittanning, Pa., succeeding D. B. Bartholomew.

W. T. Fitzgerald, Master Mechanic of the Wisconsin & Michigan, has resigned to accept service elsewhere, and his duties are assumed by S. N. Harrison, Superintendent, the office of Master Mechanic being abolished.

C. E. Fuller, Assistant Superintendent of Motive Power and Machinery of the Union Pacific, has been appointed Superintendent of Motive Power and Machinery, with headquarters at San Francisco, Cal., succeeding W. R. McKeen, Jr., resigned to go into other business, as noted in another column.

Purchasing Officers.

John L. Shick has been appointed Storekeeper of the New York, Susquehanna & Western, with office at Stroudsburg, Pa., succeeding F. C. Pearce, resigned.

The office of Purchasing Agent of the Atlanta, Birmingham & Atlantic and the Atlanta & Birmingham Construction Co. has been abolished, and the duties of that office are to be performed by Alex. Bonnyman, General Manager of the Atlanta, Birmingham & Atlantic, and Chief Engineer of the Atlanta & Birmingham Construction Co.

OBITUARY.

Henry C. Townsend, formerly General Passenger and Ticket Agent of the Missouri Pacific, died on June 30, at Port Huron, Mich. He was born in 1847 at Pittsburgh, Pa., and began railroad work in 1863 as clerk in the Auditor's office of the Bellefontaine Railroad, now part of the Big Four. By 1877

he had become General Passenger and Ticket Agent of the Wabash. In 1883 he was appointed General Passenger Agent of the Missouri Pacific, also of the Wabash, St. Louis & Pacific, now part of the Wabash. In 1884 he was appointed General Passenger and Ticket Agent of the Missouri Pacific. He retired from active railroad work some time before his death. During 1900-1901 he was President of the Association of General Passenger and Ticket Agents.

Joseph T. Ripley, formerly on the Atchison, Topeka & Santa Fe, and who is a brother of E. P. Ripley, President of the Atchison, died suddenly at Chicago on July 9 from the bursting of a blood vessel. He was born on February 22, 1848, at Dorchester, Mass., and entered railroad service in 1877. He was from 1877 to 1879 a clerk in the division freight office of the Chicago, Burlington & Quincy, at Quincy, Ill.; 1879 to 1883, commercial agent of the same road at Rock Island, Ill.; November, 1883, to September 1, 1884, Assistant General Freight Agent of the Wabash, St. Louis & Pacific, now part of the Wabash; September 1, 1884, to August 1, 1887, Commissioner of the Burlington-Wabash pool; January 1, 1887, to February, 1888, Chairman of the Chicago Railway Exchange; February, 1888, to December 17, 1888, General Agent of the Burlington at St. Louis, Mo.; December 17, 1888, to January, 1904, Chairman of the Western Classification Committee at Chicago. In August, 1905, he went into the President's office of the Atchison.

Railroad Construction.

New Incorporations, Surveys, Etc.

ALEXANDER, LEESVILLE & LUFKIN.—A contract for building a part of the line from Lufkin, Tex., east to Alexandria, La., is said to have been let to J. S. Moore, of Lufkin. F. French, Chief Engineer. (July 3, p. 456.)

ALTUS, ROSWELL & EL PASO.—Actual construction now under way between Altus, Okla., and Hollis. The company was organized to build from Altus, Jackson county, Okla., west to Memphis, Tex., thence to Roswell, N. Mex., and to El Paso, Tex., about 400 miles. Contracts for first 34 miles from Altus let to A. Key, of Hollis, W. Hines and Nels Anderson, of Altus; also, it is said, for 65,000 ties, and for a 1,700-ft. bridge over the Salt Fork of Red river between Altus and Duke. (June 5, p. 47.)

ARKANSAS, LOUISIANA & GULF.—This company, which is said to have work under way at Hamburg, Ark., contemplates the extension of the line north to Monticello, about 30 miles. J. M. Parker, General Manager, Monroe, La. (R. R. G., May 8, p. 654.)

ASHVILLE & CAROLINA (ELECTRIC).—Incorporated in North Carolina with \$200,000 capital and office at Ashville. The company was organized to build an electric line from Ashville south to the South Carolina state line, about 35 miles, and also to take over the franchise of the Ashville & Hendersonville, which owns a right of way from Ashville to Hendersonville and has surveys made. Actual work is to be started about the middle of August. A charter has also been granted the company in South Carolina to build an electric line from Greenville north to the North Carolina state line, 40 miles. The two lines will join and form one continuous road. Contract let to the Carolina Construction Co., Raleigh, N. C. Power plants will be located in the Blue Ridge mountains, about 20 miles from Ashville. The incorporators include: C. F. White, F. J. Allison, J. W. Brunson and F. R. Grant, of Ashville; L. W. Walker, P. F. Patton and J. W. Rowland, of Hendersonville.

ATLANTA, BIRMINGHAM & ATLANTIC.—It is expected that the western extension under construction from Talladega, Ala., to Birmingham, 75 miles, will be finished from Talladega to Bessemer by the middle of August. On this section only one large cut remains to be finished. From Bessemer it is said trackage rights have been secured from the Alabama Great Southern into the L. & N. station, Birmingham. (June 26, p. 49.)

ATLANTA NORTHEASTERN (ELECTRIC).—Surveys made and application for a charter filed for a line about 40 miles long, run-

ning through the counties of Fulton, Ga., Cobb, Milton and Forsythe. The town of Cumming, Ga., in Forsythe county, will be one terminus of the proposed line. The road is to be operated by electricity. The company is capitalized at \$50,000 and incorporated by the following: T. F. Martin and J. L. Murphy, Atlanta, Ga.; J. I. Teasley, W. A. Lummus and J. P. Brooke, Alpharetta, Ga.; J. O. Crowley and C. C. Foster, Roswell, Ga.; C. L. Harris and W. R. Otwell, of Cumming, and F. C. Tate, of Jasper, Ga.

BINGHAM & GARFIELD.—Incorporated at Salt Lake City, Utah, with \$1,000,000 capital to build about 35 miles of road in the interests of the Utah Copper Co., connecting the mines with its concentrating plant. The road will also serve other mining companies, also the Boston Consolidated's mill and a smelter at the terminus at Garfield. W. S. McCormick, President; D. C. Jackling, Vice-President, and J. M. Hayes, Secretary and Treasurer.

BURLINGTON COUNTY RAILROAD.—It is said that Governor Stuart, of Pennsylvania, has authorized this company to further extend the line of the Mt. Holly & Gettysburg Electric Co., from Hunters' Run, Pa., southwest through Bendersville and Arendtsville, thence 26 miles south to Gettysburg.

CANADIAN NORTHERN.—The line between Parry Sound and Sudbury, Ont., was opened for traffic July 4, a special train conveying a party of directors of the company, and members of the Toronto and other boards of trade, over the route to the Moose mountain mines and smelter. The main line between Toronto, Ont., and Sudbury is now completed, as are the branches to the Moose mountain mines and to Key Inlet, the company's Georgian bay port, from which ore will be shipped to the smelters. From Toronto to the Moose mountain mines is about 290 miles, and a further 550 miles remain to be built from that point to Port Arthur. The track has been laid with 80-lb. rails and a steel viaduct, 280 ft. long and 100 ft. above water level, has been built across the Still river. Another bridge, of the through span type, 296 ft. long, 50 ft. above water level, has been built over the Pickerel river. The bridge across the French river is of the deck lattice girder type, each span being 110 ft. long, the central pier being of concrete resting on a rocky islet in the bed of the river. See Canadian Roads.

CANADIAN PACIFIC.—Bids are wanted July 31 by C. E. Cartwright, Chief Engineer, Victoria, B. C., for grading and bridging 11 miles of the Esquimalt & Nanaimo extension to French Creek. (June 12, p. 95.)

CANADIAN ROADS.—The Canadian House of Commons has voted \$100,000 for a survey of the route of the proposed Hudson Bay line. It is now said that instead of arranging to continue the Canadian Northern line, the northern terminus of which is now at La Pas, on the Saskatchewan river, the government will build to Fort Churchill, on Hudson Bay, and will grant various railroads trackage right over the proposed line.

CENTRAL KENTUCKY TRACTION.—It is said that this company has decided to build a line from Lexington, Ky., south to Nicholasville, 12 miles. Work is expected to begin by August 1. J. B. Crawford, General Manager, Lexington, Ky. (R. R. G., Aug. 16, 1907, p. 189.)

CHESAPEAKE & OHIO.—The Coal River Railway is now in operation from St. Albans, W. Va., to Peytona, 29 miles. The new branch of the Huntington division, called the Little Coal Extension, running from West Madison to Sproul, 22 miles, is in operation and a new line has been opened for business from Red Warrior east to Colcord, 17 miles.

COAL RIVER RAILWAY.—See Chesapeake & Ohio.

COPPER RIVER RAILWAY.—It is said that over a thousand men are now at work grading the line of this road, which is being built north into the interior of Alaska. Two big cuts at Alaganik are finished, and the track laying crews have resumed work. (June 5, p. 47.)

DELAWARE, LACKAWANNA & WESTERN.—Contracts for the 28-mile cut-off from Lake Hopatcong, N. J., to Andover, through Warren county to Slateford, Pa., three miles east of Delaware Water Gap, have been let for the seven sections as follows:

Section 1, 2½ miles, to Timothy Burke, Scranton, Pa.

Section 2, 2 miles, to Waitz & Reece Construction Co., Billings, Mont.

Section 3, 4½ miles, to David W. Flickwir, Roanoke, Va.

Section 4, 5½ miles, to W. H. Gahagan, Brooklyn, N. Y.

Section 5, 5 miles, to Hyde, McFarlin Co., New York.

Section 6, 5 miles, to Reiter, Curtis & Hill, Philadelphia, Pa.

Section 7, 3½ miles, to Smith, McCormick Co., Easton, Pa. (R. R. G., May 29, p. 747.)

DENVER, NORTHWESTERN & PACIFIC.—The extension from McCoy, Colo., to Crater, 4½ miles, has been opened for operation. Construction is under way further west to Steamboat Springs, and thence to Salt Lake City, Utah. (R. R. G., May 15, p. 687.)

ESQUIMALT & NANAIMO.—See Canadian Pacific.

GALLATIN PIKE RAILWAY.—Incorporated with \$25,000 capital stock to build a line along Gallatin turnpike, Davidson county, Tenn. The line will be about two miles long and has the privilege of carrying both freight and passengers and of operating either by steam or electricity. The incorporators are: E. B. Rucker, C. H. Gilcock, Mora H. Sharpe, P. A. Shelton and J. H. Zarecor.

GRAND TRUNK PACIFIC.—Hon. George P. Graham, Minister of Railways, recently said, in a statement before the Dominion Parliament, that he expected to see the Grand Trunk Pacific completed by December, 1911. He estimated the cost of the Eastern division, 1,804 miles, from Moncton, N. B., to Winnipeg, Man., at \$63,437 per mile, not including interest, making a total of \$114,440,348 for this section of the work. Cost of terminals at Moncton he estimated at \$97,000, and the terminals at Quebec \$2,000,000. The amount payable by the Canadian government for terminals at Winnipeg, in accordance with its agreement with the Canadian Northern and Grand Trunk Pacific, assuming the buildings to cost \$2,000,000, will be \$48,750 a year. The estimated cost of construction of the prairie section of the Grand Trunk Pacific, from Winnipeg, Man., to Wolf Creek, Alb., 119½ miles west of Edmonton, is \$61,520,000. The total liability of the government for the Quebec bridge is \$6,678,200.

ILWACO RAILWAY & NAVIGATION.—See Oregon Railroad & Navigation.

KANSAS CITY SOUTHEASTERN (ELECTRIC).—This company proposes to build a line from Kansas City, Mo., to St. Louis. The division from Kansas City, Mo., to Lone Jack, 30 miles, is now under consideration. Surveys are said to be completed from Kansas City to Lee's Summit, 18 miles. Right of way has been arranged for from Lee's Summit to Lone Jack, but surveys are not yet completed. The line will also pass through Leeds, Raytown, Little Blue, County Farm and Cockrell. It is said that bids for construction are to be asked for soon. H. W. Gibson, Vice-President; B. F. Shouse, Treasurer; C. G. Minturn, Secretary; W. W. Collins, Auditor, all of Kansas City.

KEWEENAW CENTRAL.—The extension from Mohawk, Mich., to Calumet has been completed and the line from Calumet to Mandan, in the extreme upper peninsula of Michigan, is now in operation. The line, which is about 35 miles long, traverses a country said to be rich in mineral deposits. It is also a fine hunting and fishing and summer resort region. A good part of the road has been built and in operation for more than a year. The country is rugged and construction was difficult. The portion between Mohawk and Calumet, which has just been finished, was the most difficult and costly section of all, there being some heavy rock work. The Keweenaw Central connects with both the Mineral Range and the Copper Range railroads at its southern end and through connections can therefore be established with Chicago. The road is owned by the Keweenaw Copper Co.

KNOXVILLE, SEVIERVILLE & EASTERN.—An officer writes that grading has been started by William J. Oliver, who has the general contract for building the line. It is expected to have additional contracts let for all the work by the middle of August. The proposed route is from Knoxville, Tenn., southeast to Sevierville, 26 miles. The line may eventually be extended into North Carolina. W. A. Seymour, Chief Engineer. (June 12, p. 95.)

LOGANSPORT-MARION (ELECTRIC).—Surveys are said to have begun at Marion, Ind., for this road, which will pass through

Sweetser, Mier, Converse, Amboy, Bunker Hill and North Grove. H. F. Coleman, Logansport, is interested.

LORAIN, ASHLAND & SOUTHERN.—Finished last year 22 miles of road from Lorain, Ohio, south to Wellington. It is said that grading has been finished on 25 miles more and work is to be started shortly on the remaining 15 miles of the proposed extension south to Loudonville, on the Pennsylvania Lines West. The Ohio & Southern Construction Co., of which W. D. Holiday is President, is building the line. (R. R. G., Dec. 30, p. 765.)

MESA VALLEY & EL PASO.—Recently organized, with \$1,000,000 capital stock, to build from El Paso, Tex., to Las Cruces, N. Mex., about 44 miles. The general offices are at El Paso.

MILWAUKEE LIGHT, HEAT & TRACTION.—Announcement is said to have been made that an extension from Oconomowoc, Wis., to the terminal at Watertown is to be opened August 1. It is also said that the company will next year start construction work on a radial system with Watertown as a center.

MILWAUKEE NORTHERN (ELECTRIC).—F. W. Walker, Vice-President and Chief Engineer, is said to have announced that the extension from Cedarburg, Wis., to Sheboygan, 30 miles, is expected to be ready for traffic on September 1. The extension from Cedarburg northwest to West Bend and Fond du Lac is expected to be finished by November. (R. R. G., Nov. 8, p. 573.)

NARROWS TERMINAL BELT.—Incorporated with \$250,000 capital stock to build a belt line at Tacoma, Wash. The incorporators are: Lucian F. Cook, Henry L. Gray, Charles E. Cutter, C. Andrew Tonneson and Fred S. Cook.

NASHVILLE & LOUISBURG.—Organized in Tennessee with \$25,000 capital to build from Nashville, Tenn., south to Louisville, 60 miles. It has not been decided whether the company will use steam or electricity as motive power. E. R. Richardson, E. Jones, J. R. Thompson, J. R. Shepard and R. J. Lyle are interested.

NEW YORK, NEW HAVEN & HARTFORD.—Bids were to be opened July 16 for building an electric line from Hartford, Conn., south via Weathersfield, Rocky Hill and Cromwell to Middletown, about 20 miles.

NORTHERN MINNESOTA.—Incorporated with \$100,000 capital stock to build from Warroad, Minn., through Roseau, Pelan, Badger and Karlstad to a point on the Red River of the North in Marshall county, about 60 miles. George H. Seeley, W. M. Jerome and H. G. Spaulding, all of Minneapolis, Minn., are the incorporators.

NORTHERN PACIFIC.—Operation of the Lapwai branch of the Idaho division has been extended from Cul de Sac, Idaho, south to Vollmer, 23 miles.

OCEAN SHORE.—An extension has been finished from Farallone, Cal., to Granada, 4.7 miles.

OKLAHOMA CENTRAL.—Plans, it is said, are being made to build an extension from Chickasha, Okla., the present western terminus, northwest via Anadarko, Weatherford, Taloga, Gage and Beaver City, to a Kansas connection.

OREGON RAILROAD & NAVIGATION.—The Ilwaco Railway & Navigation Co. has finished a 14-mile extension from Ilwaco Junction, Wash., east along the north bank of the Columbia river to Megler, at which point there is a large dock. The work was difficult, as it required a large amount of rip-rapping to prevent the water undermining the track where the line skirts the river. It also included a 1,000-ft. tunnel. (R. R. G., March 13, p. 393.)

OREGON SHORT LINE.—The St. Anthony branch is now in operation from Idaho Falls, Idaho, northwest to Yellowstone, 108 miles.

PENNSYLVANIA.—Plans, it is said, are now under consideration to make a cut in place of the present main line tunnel near Greensburg, Pa. The tunnel has two tracks and is one of the few remaining sections on the main line between Pittsburgh and Philadelphia which have not yet been four-tracked. It is intended to lay two additional tracks and the excavation work will be heavy.

PUGET SOUND (ELECTRIC).—General Manager W. S. Dimmock,

Tacoma, Wash., is quoted as saying that construction work is to be started at once on the proposed extension from a point on the main line, near Brookville, to the Puyallup river. Some of the work will be done by the company's men, and the rest of it by contract.

SANOODY VALLEY RAILROAD.—An officer is quoted as confirming the report that this road will run from DeKalb, Miss., to Sucarnochee, on the Mobile & Ohio, 14 miles. It is further said that it will cost \$100,000. S. O. Bell, DeKalb, Miss., is interested.

SHAWNEE CENTRAL.—It is said that surveys have been completed from Shawnee, Okla., northeast via Weleetka to Muskogee, about 120 miles. It is also said that contracts for construction are to be let about August 1. J. M. Aydelotte, President; F. H. Peckham, Chief Engineer, Shawnee. (R. R. G., Sept. 20, 1907, p. 340.)

SOUTHERN PACIFIC.—An amendment has been filed in Texas permitting the building of two branch lines. One of the proposed branches is to run from Gallatin south to Rusk, about eight miles, and the other from West Port Arthur northeast to Port Arthur, 10 miles.

The Sonora Railway is, it is said, to be rebuilt from Nogales, Ariz., to Guaymas, Mex., 260 miles. The concession for this improvement work was recently granted to A. H. McKay, of Mexico City, representing the Southern Pacific in Mexico. He is allowed to bring in all construction materials free of duty. This branch line connects with the Cananea, Yaqui River & Pacific at Guaymas.

TEXAS ROADS.—The revised list of mileage built in Texas during the fiscal year ending June 30, according to a report of the engineer of the state railroad commission, shows a total of 320 miles. The state had a total of 12,576 miles in operation on June 30, 1907, making the present total of 12,896 miles. All of this is steam railroad mileage. The list of the new construction follows:

	Miles.
Beaumont & Great Northern:	
Beaumont to Livingston	12.90
Beaumont, Sour Lake & Western:	
Sour Lake to Houston	64.28
Burr's Ferry, Prowdel & Chester:	
Rockland to Turpentine	4.02
Chicago, Rock Island & Gulf:	
Irving to Carrollton	10.82
Galveston, Terminal:	
In Galveston (main line)	4.26
Kansas City, Mexico & Orient:	
Knox City to Truscott	22.50
San Angelo, north	12.00
Roscoe, Snyder & Pacific:	
Roscoe to Snyder	30.21
St. Louis Southwestern:	
Warsaw to Broadus	6.00
Southern Kansas:	
Panhandle to Amarillo, net	10.90
Southwestern of Texas:	
Henrietta to Scotland	19.55
Stephen, North & South Texas:	
Stephenville to Hamilton	42.70
Texas & New Orleans:	
Port Arthur branch	3.70
Texas State Railroads:	
Rusk to Moshaw	15.70
Weatherford, Mineral Wells & Northwestern:	
Mineral Wells to Grafford	20.64
Wichita Falls & Southern:	
Wichita Falls to Olney	39.70
Total	319.88

VICTOR & EASTERN.—Incorporated in California with \$150,000 capital, to build from Victorville to the Black mountains, 11 miles, thence east to a point not yet determined. F. H. Merrell, H. Albright, A. A. Baird and A. Moore, of Los Angeles; J. J. Meacham, of Racine; C. H. Hamilton, of Pasadena, and F. Banks, of South Pasadena, are interested.

WASHINGTON, WESTMINSTER & GETTYSBURG.—T. P. Redmond, General Manager, is said to have applied at Westminster, Md., for a franchise for the proposed line from Washington, D. C., northwest to Gettysburg, Pa., about 90 miles. J. B. Colgrove, President, Washington, D. C. (R.R.G., March 13, p. 395.)

WEAVERVILLE ELECTRIC CO.—An officer is quoted as saying that this company is prepared to receive bids for building four miles of line from New Bridge Station, N. C., on the Asheville Rapid Transit line, northwest to Weaverville. The work will necessitate moving about 20,000 yards of earth and building three bridges, the total length of which will be about 300 ft. J. H. Carter, President; D. M. Lee, Engineer in Charge, Asheville, N. C.

Railroad Financial News.

ATCHISON, TOPEKA & SANTA FE.—Eversz & Co., Chicago, are offering \$400,000 first mortgage 5 per cent. bonds of 1901-1921 of the Cane Belt Railroad. The offering price is 98. The entire capital stock of the Cane Belt is owned by the Atchison, Topeka & Santa Fe. The road runs from Matagorda, Texas, on the Gulf of Mexico, to the main line of the Gulf, Colorado & Santa Fe at Sealy, Texas, about 110 miles. The bonds are a first lien at the rate of \$7,000 per mile on the property, including equipment, of the Cane Belt.

BALTIMORE & OHIO.—The regular semi-annual dividends of 3 per cent. on the common and 2 per cent. on the preferred stock have been declared. In declaring the dividends, the directors made the following statement: "The earnings for the year fell short of meeting the full dividends of the company by about \$1,300,000, and the difference was paid out of profit and loss surplus, leaving about \$18,000,000 still to the credit of that account."

BULLFROG GOLDFIELD R. R.—See Tonopah & Tidewater Co.

CANADIAN NORTHERN.—See Niagara, St. Catharines & Toronto.

CANE BELT.—See Atchison, Topeka & Santa Fe.

CHICAGO & MILWAUKEE ELECTRIC.—The receivers were authorized on July 3 to pay the semi-annual interest due July 1 on \$1,000,000, or slightly more, C. & M. E. Railway first mortgage 5 per cent. bonds of 1899-1919. The interest due July 1 on the \$4,000,000 C. & M. E. Railroad first mortgage bonds of 1902-1922 was defaulted.

CHICAGO, MILWAUKEE & ST. PAUL.—See Tacoma Eastern.

DELAWARE & HUDSON.—The New York Public Service Commission, Second District, on July 9 authorized the Delaware & Hudson to sell \$13,309,000 refunding bonds at not less than 95. It also approved the issue of \$6,500,000 bonds to retire at par the \$5,000,000 7 per cent. Delaware & Hudson, Pennsylvania division, bonds of 1877-1917; \$500,000 Schenectady & Duanesburg 6 per cent. bonds of 1874-1924; and \$1,000,000 Adirondack Railway 4½ per cent. bonds of 1892-1942. Decision was reserved on the application to issue \$6,691,000 additional bonds to cover advances to the Hudson Coal Co. for coal lands, and for the purchase by the D. & H. of securities of the Hudson Valley Railway and the Troy & New England Railroad.

GREAT NORTHERN.—The Northern Pacific has filed records deeding to the Great Northern 17½ acres of tidelands near the head of Commencement bay, Tacoma, Wash. The consideration named is \$1. The tract is approximately 2,000 ft. long and 400 ft. wide, extending from the city waterway to East L street along the projected eastward extension of Twenty-first street. The ground lies immediately north of the Northern Pacific yards.

METROPOLITAN STREET RAILWAY.—See New York City Railway.

MISSOURI RIVER & NORTH-WESTERN.—A conference of all bondholders, receivership creditors and general creditors will be held at Rapid City, S. Dak., on July 20, to formulate a plan for reorganization and for the rehabilitation of the property. The receiver has issued a statement regarding the history and affairs of the company. He asserts that the stockholders have no longer any interest in the property and that neither C. D. Crouch, President and General Manager, nor W. J. Hayes, Secretary and Treasurer, are, as stockholders, to be considered in any reorganization plan, the only classes of creditors entitled to consideration being bondholders under the mortgage to the Cleveland Trust Co., and the receivership creditors. The largest receivership creditor is the Chicago, Burlington & Quincy. The receiver states, that, although strongly solicited to make bids, neither the Chicago & North-Western, the Chicago, Milwaukee & St. Paul nor the Chicago, Burlington & Quincy could be induced to bid for the road at the upset price of \$350,000. The present financial condition of the property is as follows: There have been issued \$1,000,000 6 per cent. bonds, of which the semi-annual interest coupons due June 1, 1907; December 1, 1907, and June 1, 1908, are unpaid. Of

the bonds, approximately \$779,000 have been sold and the proceeds accounted for to the company, while \$221,000 of the bonds, which have been placed in the hands of W. J. Hayes & Son, financial agents, have not been returned to the company nor has any accounting been made. The receivership expenses and indebtedness approximate \$300,000, of which \$160,000 is represented by two series of receivers' certificates, and \$140,000 by unpaid vouchers, time checks, etc. Allowing for offsets, the legitimate receivership indebtedness and expenses will not fall short of \$250,000. There are also outstanding damage claims amounting to over \$100,000. On September 30, 1906, there had been issued \$500,000 common and \$500,000 preferred stock, and the Missouri River & North-Western had cost, in money actually spent by the company, \$445,928.12. The Missouri River & North-Western was incorporated in South Dakota in 1904, succeeding the Dakota, Wyoming & Missouri River, incorporated in 1891. C. D. Crouch was President and chief stockholder of both corporations, and also principal contractor in charge of construction for the original company.

NASHVILLE, CHATTANOOGA & ST. LOUIS.—The directors on July 14 declared a semi-annual dividend of 2½ per cent. on the stock, thus reducing the annual rate from 6 per cent. to 5 per cent. In 1907, 6 per cent. was paid, and in 1905 and 1906 the annual rate was 5 per cent.

NEW YORK CITY RAILWAY.—Judge Lacombe, of the United States Circuit Court, has granted a motion to appoint a separate receiver for the Metropolitan Street Railway Co. Messrs. Joline and Robinson, receivers of the New York City Railway, have been heretofore also receivers of the Metropolitan Street Railway.

NEW YORK, NEW HAVEN & HARTFORD.—This company has sold the \$10,994,900 Boston & Maine stock which it held to John L. Billard, president of the Meriden (Conn.) Savings Bank. A suit has been in progress seeking to compel the New York, New Haven & Hartford to sell this stock. See article on page 513.

NIAGARA, ST. CATHARINES & TORONTO.—This company, which operates by both steam and electricity 43 miles of road from Niagara Falls, N. Y., to St. Catharines, Ont., Port Dalhousie, etc., has, it is said, been taken over by the Mackenzie-Mann (Canadian Northern) interests.

NORTHERN PACIFIC.—See Great Northern.

TACOMA EASTERN.—It is reported from Tacoma, Wash., that counsel for the Chicago, Milwaukee & St. Paul admitted at a recent hearing before the Tacoma city council that the St. Paul has acquired control of the Tacoma Eastern. It was originally a logging road, running southward from Tacoma. It owns tidewater terminals on Puget sound. It is the only line that runs to Mt. Rainier National Park and does a considerable summer tourist business.

TEXAS SOUTHERN.—The Texas Southern was not sold on July 7 at Marshall, Tex., as had been advertised, because no bids were received. The minimum price at which the road was ordered sold was \$375,000. On July 10, Judge W. C. Buford, of the district court of Harrison county, Texas, entered an order for the sale of the road on August 4 at an upset price of \$225,000.

TONOPAH & TIDEWATER CO.—This company, which will hereafter operate the Tonopah & Tidewater, which runs from Ludlow, Cal., to Gold Center, Nev., with branch to Ryan, Cal., 173 miles, has taken over the Bullfrog Goldfield R. R., which runs from Rhyolite, Nev., to Goldfield, Nev., 82 miles, a total of 255 miles.

VIRGINIA & SOUTHWESTERN.—The Southern Railway having completed payment for the Virginia & Southwestern, officers of the Southern have had their authority extended over the Virginia & Southwestern. (R. R. G., May 8, 1908, p. 656.)

WABASH-PITTSBURGH TERMINAL.—The receivers of this company and of the West Side Belt have asked authority to issue \$954,211 receivers' certificates for the Wabash-Pittsburgh Terminal and \$700,720 receivers' certificates for the West Side Belt. The money to be raised by the sale of these certificates is intended for repairs of tunnels and bridges and for the purchase of new engines.